

Kennebec Valley Community College

# Fairfield, Maine

## Department of Trades and Technology

## Energy Services and Technology Program

**Course Number:** PLB 102 **Course Title:** Plumbing Fundamentals

**Credit Hours:** 5 **Clock Hours:** 165

**Instructor:** Brad Harding **Office:** Room 108-C

**Office Hours:** Posted or by Appointment **Voice Mail:**

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**Text and Materials:**

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| **Author** | **Text – Materials** | **Edition** | **Publisher** | **ISBN #** |
| L.V. Ripka | Plumbing Design and Installation | 4th |  | 9780826906427 |
| L.V. Ripka | Plumbing Design and Installation Workbook | 4th |  | 9780826906434 |
|  | GreenPlumbers Reference Manual | 1st |  | (Item#: 07-GPRMS) |
|  | Safety Glasses |  |  |  |
|  | Sharp EL-506w Calculator |  |  |  |
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**Pre/Co-Requisites:** Two years of high school algebra or the equivalent

**Course Description:**

This course will introduce students to the fundamental principles of plumbing technology. Topics covered include trade safety practices, tools of the trade, plumbing materials, drainage and venting, climate care, potable water supply, water pump basics, and the basics of plumbing installations. Students will also start to earn accreditation from the Green Plumbers training program. The entire Green Plumbers accreditation course, totaling thirty-two hours of core courses, will be delivered throughout the EST program. Hands-on labs will provide training in pipefitting, water pumps, and basic plumbing skills. The initial labs will cover the proper ways to assemble copper, IPS, PEX and PVC piping systems. The next set of labs focus on the installation, service, and repair of water pumps. The final set of labs introduces the student to the basics of plumbing system installations. The instructor reserves the right to change the order in which the labs are presented.

**Course Objectives:**

It is the objective of this course to give to the student a solid foundation of plumbing fundamentals and pipe fitting knowledge. Upon successful completion of this course, each student should be able to: describe the importance of safe working habits, recognize and identify several plumbing fittings, identify the basic fundamentals of drains, waste, vents, and potable water systems, describe the different well types, explain how water is purified through the ground, understand the importance and goals of Green Plumbers program, understand and explain the fundamentals of climate change, develop skills in effectively reducing the greenhouse gas emission impacts of household plumbing services, explain why we must care for our water, understand the governing principles in pumps, identify different pump types, understand the basic concepts for installing submersible and jet type water pumps, assemble piping lines, and install pipe and fittings for a complete plumbing system on a mock-up platform. Throughout the course students will perform proper safety habits with both hand and power tools.

**Course Outline:** (The course may not be presented in this order)

1. Safety
   1. Development of safe work habits
   2. Personal safety equipment
   3. Electrical safety procedures
2. Plumbing Tools
   1. Plumbing Hand Tools
   2. Plumbing Leveling Tools
3. Plumbing materials
   1. Fitting identification
   2. Fixture supports
   3. Fixture identification
4. Drainage, waste and vent systems
   1. Common terms to plumbing
   2. Private and public sewerage systems
   3. Plumbing trap and relationship to vents
   4. Sizing the drain and vent system
5. Green Plumbers: Climate Care
   1. Introduction to Climate Change
   2. The Water-Energy-Green House Gas Relationship
   3. Why Hot Water?
   4. Water Heating Technologies
   5. Hot Water Distribution
6. Potable water supply
   1. Green Plumbers: Caring for our Water
      1. A precious resource
      2. Water conservation programs and strategies
      3. Other indoor conservation opportunities
   2. Water supply methods
   3. Water supply materials and procedures
7. Water Pump Basics
   1. Green Plumbers: Principles in Pumps
      1. Understanding the physics of transferring water
      2. Identifying the characteristics of basic residential pumps
      3. Identifying the characteristics of electric motors for pumps
      4. Providing advice on pump performance
      5. Selecting an appropriate pump for residential homes
      6. Advising control devices suitable for use with pumps in residential applications
   2. Review of water sources
      1. Explanation of hydrological cycle
      2. Discussion well types
   3. Review of residential water pump basic knowledge
      1. Common pump types
         1. piston pumps
         2. jet pumps; deep and shallow
         3. submersible
   4. Assembly of water pump systems
      1. Jet pump system assembly
      2. Submersible systems assembly
   5. Major components of common pump systems
      1. Water pump tanks
         1. diaphragm type tanks; installation and set-up
         2. non diaphragm type tanks; installation and set-up
   6. Water pump installation rules for Maine
      1. General requirements
         1. Licensing of installers
   7. Water pump servicing and troubleshooting
      1. Servicing shallow well jet pumps
      2. Servicing deep well jet pumps
      3. Diagnosing electrical problems
8. Plumbing system installation
   1. Roughing in of a plumbing system
   2. Installation of drain and vent pipes
   3. Installation of copper water lines
   4. Setting of fixtures

**Lab Projects:**

1. Safety in the shop
2. Using power tools
3. Assembling pipe fittings
   1. Compression
   2. Flared
   3. Soldered copper
   4. IPS
   5. PEX
   6. PVC
   7. Threaded steel
   8. Others
4. Water Pumps
   1. Water Pump Components
   2. Water Pump Installation
5. Plumbing System Installation
   1. Roughing-in
   2. Drains and vents
   3. Potable water lines
   4. Fixture Installation

**Course Activities:**

* Lectures and demonstrations on theory, analysis and applications.
* Students will apply theory by means of associated lab procedures.
* Lab assignments will be distributed weekly.

**Course Evaluation:**

The individual's evaluation for a grade will be based on:

Quizzes 50%

Lab Evaluation 30%

Comprehensive Final Exam 20%

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* The minimum acceptable grade to receive credit for this course is a "C" (73%-76%)*.*

**Late Work:**

Lab work and assignments will not be accepted after the due date. All late work will be recorded as a zero. Students who are absent the day a test or quiz is assigned are required to make up the test / quiz within 5 school days. Failure to make up the tests/quizzes will be recorded as a zero. Students are responsible for making any necessary arrangements with the instructor. There are no makeup days for missed classes or lab time.

**Attendance Policy:**

The Trades and Technology Department believes that regular and prompt attendance at each class session is extremely important. It is also the department’s belief that excessive absenteeism and/or lateness reflect negatively upon student reliability and the department’s ability to provide quality references to potential employers.

**Absences:**

Students **will be dismissed** from this course if they exceed the maximum number of absences listed in Table 1. If a student provides the instructor in advance with a valid reason for missing a class, it will not be counted as an absence. Students sometimes miss classes and are not able to notify the instructor in advance because of sickness, family emergency, or other reason beyond their control. For absences of this type, the instructor will consider all extenuating circumstances and will determine whether the absence will be counted or not. If the total number of absences is extensive in this course, even for legitimate reasons, it may be impossible for a student to meet the objectives of the course. In such instances the instructor may assign a grade of Incomplete (I).

A student has three (3) days to appeal the assessment of an absence. The appeal must be in writing and submitted to the course instructor. If the appeal is denied, students have three (3) days to appeal the denial to the Department Chair of the Trades and Technology Department. All decisions made by the Department Chair regarding the appeal will be final.

**Table 1**

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| **# of Class Meetings**  **Per Week:** | **Maximum # of**  **Absences Allowed:** | **Student Will Be Dismissed On:** |
| 1 | 2 | 3rd Absence |
| 2 | 3 | 4th Absence |
| 3 | 4 | 5th Absence |

**Late Arrivals:**

* Students arriving to class after the scheduled start time will be considered late. Two (2) late arrivals will be equal to one (1) absence.
* Students arriving to class 10 minutes or more beyond the scheduled start time will be assessed an absence.

**STUDENTS WITH DISABILITIES**

In accordance with Section 504 of the Rehabilitation Act of 1973 and Title II of the Americans with Disabilities Act of 1990, this College is committed to assisting qualified students with disabilities achieve their educational goals.

If you are in need of academic accommodations in this course, you MUST contact the Coordinator of Disabilities Services in the Marden Center, King Hall, Room 130, 453-5084. You MUST provide appropriate documentation of your disability and make a timely request for accommodation to the Coordinator of Disabilities Services. Accommodations will not be granted until the faculty member receives a form establishing that the student is eligible to receive accommodations and specifying what those accommodations ought to be. Request for accommodation must be renewed each semester for each course.

This syllabus is available in enlarged print and on audio tape. Please contact the Coordinator of Disabilities Services in the Marden Center, Room 130, King Hall, to obtain these.

**NOTICE OF NONDISCRIMINATION:**

Kennebec Valley Community College is an equal opportunity/affirmative action institution and employer. For more information, please call **John Delile, the Affirmative Action Officer, at 453-5123.**