Catalog Course Description:
The basic design principles of hydraulics; water distribution; sewage systems; fire sprinkler systems; and heating, ventilation and air conditioning systems.

Entry Level Standards:
Students entering this course should have sufficient mathematical skills to manipulate various algebraic equations and basic skills of communication to allow for the comprehension and presentation of technical data. Previous courses in fluid distribution design would be beneficial but not necessary.

Prerequisites:
Second-year status

Textbook(s) and Other Course Materials:
Text:
Reference:
Other:
- Scientific Calculator
- Paper
- Pencil

I. Week/Unit/Topic Basis:

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<th>Week</th>
<th>Topic</th>
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| 1    | Lecture: Introduction to Fluid Flow  
      Lab: OPEN |
| 2    | Lecture: Continuity of Fluid Pressure/Flow; EXAM 1  
      Lab: Hydrostatic/Head Fluid Pressure |
| 3    | Lecture: Potable Water Distribution  
      Lab: Pipe Friction |
| 4    | Lecture: Plumbing Schematic Design  
      Lab: Plumbing |
| 5    | Lecture: Potable Water Distribution (Utility) |
II. Course Goals*:

The course will:

A. Expand the student’s understanding of the effects of the fluid distribution systems on building design and the effects of the building design on fluid distribution systems. I & II

B. Expand the student’s understanding of the range of plumbing materials, fittings, and means of connection commonly used in residential and commercial piping systems. I, II, III & IV

C. Expand the student’s understanding of how the principles of fluid flow affects water/air distribution systems. I & II

D. Enhance the student’s knowledge of the proper design a passive heating and cooling system. I, II, III & IV

E. Enhance the student’s knowledge of the proper design of open/closed air conditioning distribution systems. I, II, III & IV

F. Enhance the student’s knowledge of the proper design of fire sprinkler distribution systems. I, II, III & IV

G. Build the skills to communicate effectively as a technician, working with the above competencies. III

H. Foster the ability to demonstrate self initiative to complete all assignments on time. IV
III. Expected Student Learning Outcomes:

Student will be able to:

1. Explain the concept of fluid flow. A, B, C & H
2. Identify and apply the codes governing building plumbing and air distribution systems. A, B, C, E, F & H
3. Apply appropriate terminology. A, B, C, D, E, F, G & H
9. Explain the criteria involved in fluid flow. A, B, C & H
10. Explain the relationship between pipe size, fluid velocity, flow rate, and pressure. A, B, C & H
11. Explain the concept of fluid flow continuity. A, B, C & H
13. Identify and describe the basic materials used in plumbing, and the characteristics of each. B
16. Identify and describe the basic types of valves and the characteristics of each. B
17. Apply the concept of fixture units as units of flow rate. A, C, & H
18. Design a water distribution system using appropriate charts and tables in the design calculations. A, B, C, G & H
19. Identify the unique problems involving high-rise distribution systems. A, B, & H
20. Identify the plumbing requirements of a fire sprinkler system. A, B, F & H
21. Design a fire sprinkler system using appropriate charts and tables in the design calculations. A, B, F & H
22. Describe the types of closed air conditioning distribution systems and the characteristics of each. E & G
25. Describe the types of open air conditioning distribution systems and the characteristics of each. E & G
26. Describe the basic components of a passive solar heating and cooling system. D & G
28. Design a solar heating system. D, G & H

*Letters after performance expectations reference the course objectives listed above.

IV. Evaluation:

A. Testing Procedures:

Three examinations are scheduled. They will be True/False, Multiple Choice, Matching, Short Answer Essay and Problem Solving. Examinations will normally be given as scheduled. Should a student have a planned vacation, operation, etc. occur during a scheduled exam, every effort should be made to take the exam.
prior to the scheduled absence. When a student misses an exam due to illness, he must contact the instructor immediately upon return and make-up the exam within one week. There will be a lab field final - no make-up.

B. Laboratory Expectations:

**Quizzes:**
Quizzes may be given by the instructor. Most quizzes will be un-scheduled and randomly given. They cover the previous session’s materials or the reading assignment for that day. There is no make-up or extra credit given for quizzes missed.

**Homework:**
One written assignment will be required. The written assignment will consist of a synopsis of an article, taken from a periodical. Students are free to pick their own topics, as long as they relate directly to fluid flow. Students may also be required to hand in answers to select questions at the end of each chapter or other appropriate homework at the instructor's discretion. All written assignments must be handed in on 8 1/2 x 11” engineering notepad paper, paper with smooth edges, or forms provided by your instructor.
All written assignments will be assessed a 10% penalty for each school day it is late.
All student work submitted for evaluation may be retained by the instructor.

C. Field Work:

Teams will present a piping drawing at the beginning of each laboratory exercise. Upon approval of the drawing by the instructor, each team shall gather the necessary tools, equipment and materials to perform the assignment. Each team will connected piping and fittings which will be inspected for compliance with codes and tested for functionality. Grades will be based upon neatness and completeness of the drawing and upon the neatness and completeness of the plumbing in a workman like manner.

D. Other Evaluation Methods:

A subjective evaluation based on attendance, classroom participation and attitude may be included.

E. Grading Scale:

CLASSROOM (55-60%)
Final grades will be computed from the grades obtained on homework, quizzes and examinations as follows:
Quizzes & Homework = 10% - 20%
Examinations = 40% - 50% Each
LAB (40-45%)
Final grades will be determined by grades obtained on lab projects and reports.

Grades are based on the following:
90 - 100 A
85 - 89 B+
80 - 84 B
75 - 79 C+
70 - 74 C
60 - 69 D
Below 60 F

V. Policies:

A. Attendance Policy:
Pellissippi State expects students to attend all scheduled instructional activities. As a minimum, students in all courses (excluding distance learning courses) must be present for at least 75 percent of their scheduled class and laboratory meetings in order to receive credit for the course. Individual departments/programs/disciplines, with the approval of the vice president of the Learning Division, may have requirements that are more stringent. In very specific circumstances, an appeal of the policy may be addressed to the head of the department in which the course was taken. If further action is warranted, the appeal may be addressed to the vice president of the Learning Division.

B. Academic and Classroom Misconduct:

Academic misconduct committed either directly or indirectly by an individual or group is subject to disciplinary action. Prohibited activities include but are not limited to the following practices:

- Cheating, including but not limited to unauthorized assistance from material, people, or devices when taking a test, quiz, or examination; writing papers or reports; solving problems; or completing academic assignments.
- Plagiarism, including but not limited to paraphrasing, summarizing, or directly quoting published or unpublished work of another person, including online or computerized services, without proper documentation of the original source.
- Purchasing or otherwise obtaining prewritten essays, research papers, or materials prepared by another person or agency that sells term papers or other academic materials to be presented as one’s own work.
- Taking an exam for another student.
- Providing others with information and/or answers regarding exams, quizzes, homework or other classroom assignments unless explicitly authorized by the instructor.
- Any of the above occurring within the Web or distance learning environment.

C. Accommodations for disabilities:

Students who need accommodations because of a disability, have emergency medical information to share, or need special arrangements in case the building must be evacuated should inform the instructor immediately, privately after class or in her or his office. Students must present a current accommodation plan from a staff member in Services for Students with Disabilities (SSWD) in order to receive accommodations in this course. Services for Students with Disabilities may be contacted by going to Goins 127, 132, 134, 135, 131 or by phone: 539-7153 or TTY 694-6429. More information is available at

[www.pstcc.edu/departments/swd/](http://www.pstcc.edu/departments/swd/)