PELLISSIPPI STATE TECHNICAL COMMUNITY COLLEGE
MASTER SYLLABUS

MECHANICAL SYSTEMS I W/ LAB
CET 2310

Class Hours: 3.0 **Credit Hours: 4.0**

Laboratory Hours: 3.0 **Date Revised: Spring 02**

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 Reference Materials Basic to the Course:

Text:
Mechanical & Electrical Systems in Construction and Architecture, Brewer, Prentice Hall.
Reference:
Southern Standard Plumbing Code, Southern Building Code Congress.
ASHRAE Handbook, ASHRAE Publishing.
Other:
- Scientific Calculator
- Paper
- Pencil

I. Week/Unit/Topic Basis:

Week	Topic
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) Lab: Design Project
6	Lecture: Potable Water Distribution (Utility) Lab: Design Project
7	Lecture: Sprinkler System Plan Design; EXAM 2 Lab: Design Project
8	Lecture: Air Conditioning Distribution (Water Medium) Lab: Physical Plant Tour
9	Lecture: Plumbing Schematic Design Lab: Design Project
10	Lecture: Air Conditioning Distribution (Air Medium) Lab: Air Flow Measurements
11	Lecture: Plenum Layout Design; EXAM 3 Lab: Design Project
12	Lecture: Sanitary Waste & Vent Systems Lab: Design Project
13	Lecture: Sanitary Layout Design Procedures Lab: Sanitary Collection System
14	Lecture: Storm Drains Design (Building) Lab: Design Project
15	Lecture: Miscellaneous Plumbing Systems Lab: OPEN
16	FINAL EXAM

II. Course Objectives*:

A. Explain the effects of the fluid distribution systems on building design and the effects of the building design on fluid distribution systems. I, II, & III

B. Identify the range of plumbing materials, fittings, and means of connection. I, II, & IV

C. Explain the principles of fluid flow affects water/air distribution systems. I, II, & III

D. Design a gravity flow drainage and vent system. I, II, & IV

E. Design open/closed air conditioning distribution systems. I, II, IV & V

F. Design fire sprinkler, distribution systems. I, II, IV & V

G. Communicate effectively as a technician, working with the above competencies. III

*Roman numerals after course objectives reference goals of the CET program.

III. Instructional Processes*:

Students will:

1. Actively listen to class lectures and participate in class activities that develop and reinforce comprehension of the theories, concepts, principles and applications of distance measurement using surveying instruments. *Communication Outcome, Problem Solving & Decision Making Outcome, Active Learning Strategies*

2. Observe class demonstrations on the proper use of tools and equipment and then integrate cognitive and manipulative skills to successfully complete laboratory assignments. *Problem Solving & Decision Making Outcome, Technological Literacy Outcome, Numerical Literacy Outcome, Active Learning Strategies*

3. Work individually and in teams to complete lab assignments related to the theories, concepts and principles covered in the lecture portion of the course. *Communication Outcome, Problem Solving & Decision Making Outcome, Information Literacy Outcome, Active Learning Strategies*

4. Complete all lab work in a professional quality of workmanship. *Personal Development Outcome, Transitional Strategies*

5. Collect, analyze and tabulate data in an orderly format using EXCEL Spreadsheets, WordPerfect/Word or other appropriate software. *Communication Outcome, Problem Solving & Decision Making Outcome, Technological Literacy Outcome, Numerical Literacy Outcome, Information Literacy Outcome, Active Learning Strategies*

*Strategies and outcomes listed after instructional processes reference Pellissippi State's goals for strengthening general education knowledge and skills, connecting coursework to experiences beyond the classroom, and encouraging students to take active and responsible roles in the educational process.

IV. Expectations for Student Performance*:

Upon successful completion of this course, the student should be able to:

1. Explain the concept of fluid flow. A, C, D

2. Identify and apply the codes governing building plumbing and air distribution systems. A

3. Use the appropriate terminology. G

4. Demonstrate the appropriate means of design presentation. G

5. Define the concept of hydrostatic pressure. C

6. Properly use the bourdon gauges and manometers. C

7. Properly use the common types of meters and the characteristics of each. B, C

8. Explain the classifications of pumps and the characteristics of different types of pumps. B, C

9. Explain the criteria involved in fluid flow. C, D, E, F, G

10. Explain the relationship between pipe size,fluid velocity, flow rate, and pressure. C, D, E, F, G

11. Explain the concept of fluid flow continuity. C

12. Demonstrate the effect of friction and pipe length of fluid pressure. C, D, E, F, G

13. Identify and describe the basic materials used in plumbing, and the characteristics of each. B

14. Identify and describe the basic fittings and their characteristics. B

15. Demonstrate the basic means of making plumbing connections. B

16. Identify and describe the basic types of valves and the characteristics of each. B

17. Use the concept of fixture units as units of flow rate. C,G

18. Explain the process of distribution design and be capable of using various charts and tables in design calculations. D, E, F, G

19. Identify the unique problems involving high-rise distribution systems. G

20. Identify the plumbing requirements of a fire sprinkler system. F

21. Properly use the basic design criteria for fire sprinkler systems. F

22. Demonstrate the basis for determining flow rate in the A/C distribution system. E

23. Identify the plumbing requirements of a closed air conditioning distribution system. E

24. Describe the types of closed air conditioning distribution systems and theracteristics of each. E

25. Describe the types of open air conditioning distribution systems and the characteristics of each. E

26. Properly apply the basic design criteria and process for both open and closed air conditioning distribution systems. E

27. Explain the concept of a ventilated drainage system. D

28. Properly lay out a vented drainage system. D, G

29. Apply the design criteria and procedures for designing sanitary waste drainage systems. D, G

30. Explain the concept of storm drainage systems and identify the components involved. D, G

31. Apply the design criteria and typical layouts, enabling the proper sizing of all components. D, E, F, G

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

V. Evaluation:

A. Testing Procedures:

Four 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.

B. Laboratory Expectations:

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

Homework:
Two written assignments will be required. The written assignments 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:

N/A

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 = 20% - 25%
Examinations = 15% - 25% 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

VI. Policies:

A. Attendance Policy:

Pellissippi State Technical Community College expects students to attend all scheduled instructional activities. As a minimum, students in all courses must be present for at least 75 percent of their scheduled class and laboratory meetings in order to receive credit for the course (Pellissippi State Catalog). Individual departments/programs/disciplines, with the approval of the vice president of Academic and Student Affairs, may have requirements that are more stringent.

It is the student's responsibility to attend every scheduled class activity on time.
Students are responsible to get assignments missed and to make-up any work missed during an absence.

B. Academic Dishonesty:

To use any form of unauthorized aid (notes, text, etc.) during a quiz or obtain any form of help from another student during testing is considered a form of cheating. Any time any form of cheating is observed the student will receive a 0 on that quiz or test.