PELLISSIPPI STATE TECHNICAL COMMUNITY COLLEGE
MASTER SYLLABUS

MECHANICAL SYSTEMS I W/ LAB
CET 2312 (formerly CET 2310)

Class Hours: 2.0 Credit Hours: 3.0
Laboratory Hours: 3.0 Revised: Spring 05

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:
Mechanical & Electrical Systems in Construction and Architecture, Brewer, Prentice Hall.

Reference:

Other:
- Scientific Calculator
- Paper
- Pencil

I. Week/Unit/Topic Basis:

<table>
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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)  
      | Lab: Design Project |
| 6    | Lecture: Potable Water Distribution (Utility)  
      | Lab: Design Project |
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. A, C

B. Identify the range of plumbing materials, fittings, and means of connection. A, C

C. Explain the principles of fluid flow affects water/air distribution systems. A, C, F, G, J, K, L, N


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

H. Demonstrate self initiative to complete all assignments on time. E

*Letters after course objectives reference CET Program Outcomes (as required by ABET).

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, Technological Literacy 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. Technological Literacy Outcome, Mathematics 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, Technological Literacy Outcome, Active Learning Strategies

4. Complete all lab work in a professional quality of workmanship. Transitional Strategies

5. Collect, analyze and tabulate data in an orderly format using EXCEL Spreadsheets, WordPerfect/Word or other appropriate software. Communication Outcome, Technological Literacy Outcome, Mathematics Outcome, Active Learning Strategies

*Strategies and outcomes listed after instructional processes reference TBR’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 their characteristics 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. 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 sessions 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

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 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. In addition to other possible disciplinary sanctions that may be imposed as a result of academic misconduct, the instructor has the authority to assign either (1) an F or zero for the assignment or (2) an F for the course.

C. Accommodations for disabilities:

If you need accommodation because of a disability, if you have emergency medical information to share, or if you need special arrangements in case the building must be evacuated, please inform the instructor immediately. Privately after class or in the instructor's office. To request accommodations students must register with Services for Students with Disabilities: Goins 127 or 131, Phone: (865) 539-7153 or (865) 694-6751 Voice/TDD.