PELLISSIPPI STATE TECHNICAL COMMUNITY COLLEGE
MASTER SYLLABUS

MECHANICAL SYSTEMS II W/ LAB
CET 2320

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

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

Catalog Course Description:

The basic principles of electricity, wiring principles, multiphase systems, lighting fundamentals and energy management control 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.

Prerequisites:

Second-year status

Textbook(s) and Other Reference Materials Basic to the Course:

Text:
Introduction to Electrical Wiring, John Doyle, Reston Publishing, Company
Reference:
National Electrical Code, B.O.C.A.
Mechanical and Electrical Systems in Construction and Architecture, Dagostino, Prentice Hall
ASHRAE Handbook, ASHRAE Publishing.
Other:
- Scientific Calculator
- Paper
- Pencil

I. Week/Unit/Topic Basis:

Week	Topic
1	Lecture: Introduction Lab: Ohm's Law / Power Equation
2	Lecture: Ohm's Law / Power Equation Lab: Series / Parallel Circuits, (12 volts)
3	Lecture: Series / Parallel Circuits

	Lab: Generator Inspection
4	Lecture: Alternating / Direct Current; Exam 1 Lab: 120 Volt Lighting Circuit
5	Lecture: Electromagnetic Induction; AC/DC Generators Lab: 3-Way / 4-Way Switches
6	Lecture: Single / Three Phase Power & Transformers Lab: Electrical Wiring Module (dismantle, project planning)
7	Lecture: Electrical Conductors Lab: Branch Circuit Design & Wiring
8	Lecture: Conductor Insulation Lab: Branch Circuit Design & Wiring
9	Lecture: Wiring Methods; Exam 2 Lab: Branch Circuit Design & Wiring
10	Lecture: N.E.C. Requirements for Grounding Lab: Service Entrance Design & Wiring
11	Lecture: N.E.C. Requirements for Receptacle, Lighting Circuits & Special Purpose Receptacles Lab: Service Entrance Design & Wiring
12	Lecture: N.E.C. Requirements for Service Entrance; Exam 3 Lab: Electrical Wiring Module,(completion)
13	Lecture: Illumination Design Lab: Illumination design project
14	Lecture: Florescent Lighting Lab: Illumination design project
15	Lecture: HVAC Loads Lab: Open
16	FINAL EXAM

II. Course Objectives*:

A. Understand basic electricity. I, II

B. Understand basic units of electricity. I, II

C. Exhibit a basic understanding of the generation and distribution of electricity. I, II

D. Explain the common electrical wiring methods. I, II &IV

E. Explain the "N.E.C" and other regulations which govern electrical installations. I, II, III & V

F. Design an electrical system for residential buildings. I, II, III & V

G. Recognize the characteristics of related industrial power systems or non-power systems. I, II

*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. Demonstrate the ability to interpret and apply the NEC to electrical circuits. *Technological Literacy Outcome, Numerical Literacy Outcome*

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 theory of electricity. A, F, G

2. Explain the basic terminology and units of electricity. A, B, F, G

3. Explain the basic electrical equations. A, B, F, G

4. Explain the characteristics of series and parallel circuits. A, B, C, D, F, G

5. Define AC & DC current and typical sources of each. A, C, G

6. Define the principle of "electromagnetic induction". A, C, G

7. Explain the phase-time relationship between cycles of an alternating current. A, C, G

8. Demonstrate the principles of transformer operation. A, C, G

9. Demonstrate the standard methods of sizing electrical conductors. A, C, D, E, F, G

10. Explain the common design factors which affect conductor ampacity. A, B, C, D, E, F, G

11. Define conductor insulations, designations and characteristics. A, B, C, D, E, F

12. Demonstrate the methods of electrical wiring, applications and characteristics of each. D, E, F, G

13. Explain the methods of conductor enclosures, applications and characteristics. D, E, F, G

14. Explain the concept of "grounded" electrical conductors. C, D, E, F, G

15. Demonstrate the concept of "equipment grounding." C, D, E, F, G

16. Explain the "N.E.C." regulations governing color coding. C, E, F, G

17. Demonstrate how to wire the standard types of snap switches used to control electrical circuits. C, D, E, F, G

18. Demonstrate how to wire the standard types of electrical receptacles. C, D, E, F, G

19. Demonstrate how to wire the standard types of lighting outlets & fixtures. C, D, E, F, G

20. Demonstrate the common methods of providing overload protection to electrical circuits. C, D, E, F, G

21. Explain the "N.E.C." regulations governing the design of feeder and branch circuits. C, D, E, F, G

22. Explain the "N.E.C." regulations governing the design of service entrance components. C, D, E, F, G

23. Explain the "N.E.C" regulations governing the installation of electrical circuits and fixtures. C, D, E, F, G

24. Explain the procedures for illumination design. B, C, F, G

25. Explain the concept of flourescent lighting. C, 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 topic, as long as it relates directly to electrical systems. 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:

One oral presentation will be required, accounting for 5% of the total score. Topics will be assigned by the instructor. Duration of the presentation should be limited to 5-8 minutes.

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%
LAB (40-45%)
Final grades will be determined by grades obtained on lab exercises. Each exercise is graded on completeness, and code compliance.

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.