PELLISSIPPI STATE TECHNICAL COMMUNITY COLLEGE
MASTER SYLLABUS

ELECTRICAL CIRCUITS II W/ LAB
EET 1020

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

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

Catalog Course Description:

A continuation of EET 1010. This course extends DC topics to include Network Theorems such as Thevenin and Norton equivalent circuits. AC topics are covered in more detail and include series and parallel resonance, filters, and 3-phare power. Transformers and motors are also covered in more depth than in Circuits I.

Entry Level Standards:

Students entering this course must have college-level math skills.

Prerequisite:

EET 1010

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

Required:
Circuit Analysis: Theory and Practice, Robbins and Miller, Delmar publishers, 2nd Edition.
Reference:
Electrical Circuit Analysis, Boylstadt

I. Week/Unit/Topic Basis:

Week	Topic
1	Lecture: Review of series and parallel circuits, voltage and current divider basic will be reviewed. Other DC circuit basics such as internal resistance will also be reviewed Lab: DC series-parallel circuit
2	Lecture: Continued review of series parallel circuits. Current sources and branch current analysis will be covered. Lab: Internal resistance
3	Lecture: Mesh analysis, and Nodal analysis will be covered. Lab: Mesh Analysis
4	Lecture: Delta-Wye conversions, bridge circuits and superposition theorem. Lab: Bridge circuits

5	Lecture: Thevenin's and Norton's theorem's TEST #1 Lab: Thevenin's Theorems
6	Lecture: Maximum Power transfer and other network theorems. Lab: Maximum power transfer theorem
7	Lecture: Review of capacitive and inductive transients. Lab: RC transient circuit
8	Lecture: Review of AC concepts and impedance. Lab: Series-parallel RC circuit
9	Lecture: Power in AC circuits. TEST #2 Lab: Power in AC circuits
10	Lecture: AC series Parallel circuits, frequency response. Lab: Frequency response
11	Lecture: Series and parallel resonance, quality factor and RL and RC conversions. Lab: Series resonance
12	Lecture: The decibel, multistage systems and simple transfer functions Lab: Parallel resonance
13	Lecture: Filters, low-pass, high-pass, band-pass and band-reject. TEST #3 Lab: Filters
14	Lecture: Three-phase delta and wye systems and power in balanced or unbalanced systems Lab: Three phase systems
15	Lecture: Transformer basics including power ratings, applications, and transformer test. Lab: Transformers
16	Lecture: Review and Final Lab: Final

II. Course Objectives*:

A.	Understand the concepts of AC sinusoidal voltages (and currents) and the relationships to phasor voltages (and currents). II, III
B.	Understand impedance and its relationship to complex Ohm's Law. II, III
C.	Extend and adapt DC circuit, concepts, methods and theorems to AC circuits. II, III, V, VI
D.	Understand various special concepts peculiar to AC circuits. II, III, V, VI
E.	Use laboratory equipment to investigate and make measurement in electronic circuits. IV, V

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

III. Instructional Processes*:

Students will:

1. Participate in classroom discussions which challenge their abilities to think creatively and visualize complex spatial and mathematical relationships to solve problems. *Problem Solving and Decision Making Outcome*

2. Work in teams to conduct laboratory experiments and also to solve special problem assignments. These activities are designed to foster interpersonal skills in teamwork and develop and enhance leadership skills, students' abilities to express ideas, and students' abilities to reach consensus solutions for the team through negotiation. *Active Learning Strategy, Problem Solving and Decision Making Outcome, Personal Development Outcome*

3. Use electronic test equipment to test electrical circuits constructed from schematics in the laboratory and acquire data. Use computers with applications software to simulate, analyze, and predict the behavior of electrical circuits. Compare expected responses to experimental responses of electrical circuits. Use the Internet for special assignments such as locating data sheets on electronic components. Use computers with word processing software to prepare reports. *Technological Literacy Outcome, Information Literacy Outcome, Numerical Literacy Outcome*

4. Prepare reports on laboratory experiments which include methodology, mathematical analyses of electrical circuit models, a comprehensive comparison of calculated results with experimental results, and conclusions. *Communication Outcome, Numerical Literacy Outcome*

5. Discuss the importance of personal qualities such as personal responsibility, time management principles, self-esteem, sociability, self-management, integrity and honesty in school and in the workplace, and dynamics of change in the workplace. *Personal Development Outcome, Cultural Diversity and social Adaptation Outcome, Transitional Strategy*

*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. Calculate and measure in the lab the period, frequency, radian frequency, phase angle, peak value, RMS value, and value of a voltage at a particular time when given the plot or oscilloscope trace of a sinusoidal voltage. A, E

2. Calculate the phasor voltage from the sinusoidal voltage and vice-versa. A

3. Calculate the impedance of R, L, C circuits. B

4. Make complex number calculations quickly and expertly, preferably using complex mode calculators. B

5. Apply the concepts of phasors and impedances to the solution of series, parallel, and series-parallel AC circuits. C

6. Calculate the real-average power, imaginary - reactive power, and apparent-complex power

from the phasor voltage and current C, D

7. Construct a power triangle and utilize it to make power factor correction for a circuit. C, D

8. Calculate the resonant frequency and bandwidth and Q for series, parallel and series-parallel circuits. D

9. Calculate and draw the circuits for three-phase Delta a Wye generators. D

10. Draw the circuits and solve Delta source, Delta load and the other three source-load combinations including four wire circuits, balanced and unbalanced. D

11. Use the ideal transformer model to solve circuits. D

12. Be able to verify in the laboratory theoretical concepts such as Thevenin's Theorem, resonance, filters, basic laws, power factor correction. F

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

V. Evaluation:

A. Testing Procedures: 80% of grade

Chapter Tests: 50%
Homework and Quizzes 10%
Final Exam 20%

B. Laboratory Expectations: 20% of grade

The laboratories for all EET courses are an essential part of conveying the concepts to the student. The labs would closely follow the classes in content and in time of presentation so that the student is actually verifying these concepts to his or her self. The student will be able to apply the theory learned in class. The laboratory grade will be determined by a combination of performance within the lab and the quality and demonstrated comprehension of the lab report. There will be at least twelve labs during the semester to go along with the classroom material.

Performance in labs (subjective): 50%
Lab Reports (neatness and content): 30%
Laboratory Test: 20%

C. Field Work:

N/A

D. Other Evaluation Methods:

N/A

E. Grading Scale:

A 93 - 100
B+ 88 - 92
B 83 - 87
C+ 78 - 82
C 70 - 77

D 60 - 69
F Below 60

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.
Attendance is required to all lab sessions unless excused by the instructor. Students missing more than four unexcused sessions will receive an "F" and no credit will be received. Students tardy past half an hour will be considered absent.

B. Other Policies:

The student is encouraged to read the regulations for student conduct in the PSTCC Catalog and Handbook.