PELLISSIPPI STATE TECHNICAL COMMUNITY COLLEGE
MASTER SYLLABUS

ELECTRICAL CIRCUITS II W/ LAB
EET 1022 (formerly EET 1020)

Class Hours: 4.0          Credit Hours: 5.0
Laboratory Hours: 3.0     Revised: Spring 05

Catalog Course Description:
A continuation of EET 1012. 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-phase 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 1012

Textbook(s) and Other Course Materials:

Required:

Reference:
* Electrical Circuit Analysis*, Boylstadt

I. Week/Unit/Topic Basis:

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>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 and parallel circuit</td>
</tr>
<tr>
<td>2</td>
<td>Lecture: Mesh analysis, and Nodal analysis will be covered. Lab: Series-Parallel Circuits</td>
</tr>
<tr>
<td>3</td>
<td>Lecture: Delta-Wye conversions, bridge circuits and superposition theorem. Lab: Mesh Analysis</td>
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<tr>
<td>4</td>
<td>Lecture: Thevenin's and Norton's theorem's TEST #1 Lab: Thevenin's Theorems</td>
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<tr>
<td>5</td>
<td>Lecture: Review of capacitive and inductive transients. Lab: Industrial Instrumentation Application of DC Circuits</td>
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<tr>
<td>6</td>
<td>Lecture: Review of AC concepts and impedance. Lab: Series and Parallel AC Circuits</td>
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II. Course Objectives*:

A. Understand the concepts of AC sinusoidal voltages (and currents) and the relationships to phasor voltages (and currents). A, B, D, E

B. Understand impedance and its relationship to complex Ohm's Law. A, B, D, E

C. Extend and adapt DC circuit, concepts, methods and theorems to AC circuits. A, B, D, E

D. Understand various special concepts peculiar to AC circuits. A, B, D, E

E. Use laboratory equipment to investigate and make measurement in electronic circuits. A, B, D, E

F. Demonstrate, as an individual and as a team member, library/information skills, time management skills, problem-solving skills, material management skills, and communication skills. D, F, G, I, K

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

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. Mathematics 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, Mathematics Outcome, Communication 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, Mathematics 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, Mathematics Outcome, Technological 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. *Social and Behavioral Science Outcome, Transitional Strategy*

*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. 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 Electrical Engineering Technology 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:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Score Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>93 - 100</td>
</tr>
<tr>
<td>B+</td>
<td>88 - 92</td>
</tr>
<tr>
<td>B</td>
<td>83 - 87</td>
</tr>
<tr>
<td>C+</td>
<td>78 - 82</td>
</tr>
<tr>
<td>C</td>
<td>70 - 77</td>
</tr>
<tr>
<td>D</td>
<td>60 - 69</td>
</tr>
<tr>
<td>F</td>
<td>Below 60</td>
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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. 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 accommodations 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 Office located in J.L. Goins Administration Building, Room 127 or 131 or by phone: (865) 539-7153 or (865) 694-6751 Voice/TTD.