CALIFORNIA STATE POLYTECHNIC UNIVERSITY, POMONA

ETT 201

COURSE OUTLINE

Course Information	**ABET Unit Classification** (4 Quarter Units)	
Department: Engineering Technology	Math:	
Course Number: ETT 201/201L	Basic Science:	
Course Title: Electrical Technology/Lab	Engineering Topics:	4
Revision Date: 12/14/04	*Contains significant design content:*	Yes
Revised by: Lyle B. McCurdy	Other:	
Compliant: Catalog 2004/05	Curriculum Designation:	Required

I. Catalog Description

ETT 201/201L Electrical Technology/Lab (3/1)

Introduction to DC and AC circuit theory and applications involving resistance, inductance, and capacitance; characteristics of passive filters; operation and application of basic electrical measuring instruments. 3 lectures/problem-solving and 1 three-hour laboratory. Prerequisite: PHY 123/L. Not open to ECET majors.

II. Prerequisites and Co-requisites

College algebra and trigonometry-based physics course including background in atomic structure, electricity, and magnetism.

III. Textbook and/or Other Required Material

Text: Boylstad and Nashelsky, Introduction to Electricity, Electronics, and Electromagnetics, 5/E, Prentice-Hall, 2002. ISBN 0-13-010573-2, or equivalent.
Keown, OrCAD PSpice & Circuit Analysis, 4th ed., or equivalent

IV. Course Objectives

After completing this course the student will be able to:

1. Solve problems associated with sinusoidal waveforms including frequency, time, and magnitude; and be able to solve basic DC and AC circuit problems associated with series, parallel, and series-parallel networks.

2. Solve basic RC and RL transient problems involving voltage, current, and time constants.

3. Solve basic problems associated with single and three-phase power systems for home and business.

4. Solve basic voltage-current problems associated with ideal transformers, and be able to utilize relays to control large voltages and/or currents.

5. Work in team settings to connect and utilize practical electrical circuits and devices in the laboratory and utilize appropriate measuring instruments to measure, record data from those experiments, and document the results in formal reports written to professional writing standards.

V. Expanded Course Description

1. Fundamentals of DC circuits (3 weeks)
   Ohm's law; resistance, voltage, and current in series and series-parallel DC circuits; voltage-reference designations; characteristics of capacitors and inductors; transients in RC and RL circuits.

2. Fundamentals of AC circuits (3 weeks)
   Characteristics of sinusoidal waveforms -- time, frequency, and magnitude; capacitive and inductive reactance in AC circuits; basics of phasors and vectors.

3. Fundamentals of power in AC circuits. (2 weeks)
   Survey of single of three-phase power components and systems.

4. Fundamentals of transformers and relays (2 weeks)
   Characteristics and applications of ideal transformers and relays.

VI. Class/Laboratory Schedule

Lecture: Two 75 minute sessions per week, Lab: One 3 hour session per week.

VII. Contribution of Course to Professional Component

Lecture: Students learn to work with DC and AC circuits; transients in RC and RC circuits, AC power, transformers and relays.

Lab: A wide range of measurement techniques are used in lab exercises. Students learn to analyze and interconnect electrical circuits and components, gather data and to prepare technical reports.

VIII. Evaluation of Students

The instructor evaluates outcomes using the following methods: homework assignment submittals, midterm and final exams, one-on-one discussions during office hours, laboratory experiments, and laboratory reports. Student grades are typically based on the following factors: quizzes, homework, midterm exam and final Exam.

IX. Relationship of Course to Program Outcomes

Crse Obj	Program Outcomes										
	(a) **Use of modern tools of discipl**	***(b)*** **Use of math, science, Engg & Tech**	***(c)*** **Do experi -ments**	***(d)*** **Dsn of sys & compo nents**	***(e)*** **Work on teams**	***(f)*** **Do Tech probs**	***(g)*** **Eff Com**	***(h)*** **Life-long learn**	***(i)*** **Prof, ethics, social resps**	***(j)*** **Prof, soc, globl, diversity**	***(k)*** **Qual, Cont impr, timeli ness**
1	x	X	X			X					
2	x	X	X			X					
3	x	X	X			X					
4	x		X			X					
5	x	X	X		X	X	X				

X. Typical Laboratory Experiments. Here, the students work with DC and AC circuits, investigate transients in RC and RL circuits, work with power, transformers, and relays in practical laboratory applications. The following labs are oriented to achieve this purpose:

Lab 1. Utilize appropriate test equipment to measure resistance, voltage, and current in series and series-parallel DC circuits. Formal laboratory report required to professional specifications.

Lab 2. Utilize appropriate test equipment to measure transients in RC and RL circuits. Formal laboratory report required to professional specifications.

Lab 3. Utilize appropriate test equipment to measure impedance, voltage, and current in series and series-parallel AC circuits. Formal laboratory report required to professional specifications.

Lab 4. Utilize appropriate test equipment to measure power in AC circuits. Formal laboratory report required to professional specifications.

Lab 5. Utilize appropriate test equipment to measure power, voltage and current relationships in the input/output windings of idealized transformers. Formal laboratory report required to professional specifications.

Lab 6. Use mechanical and/or solid-state relays to control large voltages and/or currents with small control signals, and be able to utilize appropriate test equipment to validate proper circuit operation. Formal laboratory report required to professional specifications.