CALIFORNIA STATE POLYTECHNIC UNIVERSITY, POMONA

ETT 321

COURSE OUTLINE

Course Information	**ABET Unit Classification** (4 Quarter Units)	
Department: Engineering Technology	Math:	
Course Number: ETT 321/321L	Basic Science:	
Course Title: Electronic Devices and Systems/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 321/321L Electronic Devices and Systems/Lab (3/1)

A survey of electronic systems including logic system, PLCs; motors, amplifiers, tuned circuits, oscillators, electro-optics, computer systems and networks. 3 lectures/problem-solving and 1 three-hour laboratory. Prerequisite: ETT 201, 215 or equivalent. Not open to ECET majors.

II. Prerequisites and Co-requisites

Basics of atomic structure, electricity, magnetism, DC and AC circuits; power, and transients in RC and RL circuits.

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. Work with basic logic systems including computer numbers and conversions (binary, hex, and decimal); ASCII characters; boolean algebra, basic logic gates, truth tables; basic memory elements and register operations.

2. Work with op-amp building blocks including, basic inverting, non-inverting, summer circuits, tuned circuits, sinusoidal and square-wave oscillators, and electro-optic circuits.

3. Work with computer systems such as a typical microcomputer, including register models, basic machine operations, use of DACs and ADCs.

4. Describe basic computer network systems and define their need and function.

5. Work with DC and AC motors and PLCs.

V. Expanded Course Description

1. Introduction to logic systems (2 weeks)
   Computer numbers and conversions (binary, hex, and decimal); ASCII characters, boolean algebra, basic logic gates, truth tables, basic memory elements and register operations.

2. Introduction to amplifiers, tuned circuits, oscillators, and electro-optic devices (3 weeks)
   Characteristics of ideal op-amps; basic inverting, non-inverting, summer circuits, etc., applications of op-amps – tuned circuits, sinusoidal and square-wave oscillators, and electro-optic circuits; basics of DACs and ADCs.

3. Introduction to computer hardware, software, and network systems (3 weeks)

Hardware and register model of a typical microcomputer, basic machine operations using machine instructions with DACs and ADCs, overview of computer network systems.

4. Motors and PLCs (2 weeks)
   Introduction to DC and AC motors, introduction to PLCs and applications.

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 amplifiers, optical electronic devices, logic systems and gates, microcomputer systems, motors and PLCs.

Lab: A wide range of measurement techniques are used in lab exercises. Students learn to analyze and interconnect electronic circuits and systems, 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

	Program Outcomes										
Crse Obj	***(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					
2		X	X			X					
3		X	X			X					
4			X			X					
5		X	X		X	X	X				

X. Typical Laboratory Experiments. Here, the students work with amplifiers, logic systems, microcomputer systems, optical electronic devices, motors, and PLCs in practical laboratory applications. The following labs are oriented to achieve this purpose:

Lab 1. Use NAND gates to build LED driver circuits; use logic circuits and truth tables to design and implement a combinational logic system with NAND gates. Formal laboratory report required.

Lab 2. Use IC register chips to learn basic register operations associated with computers. Formal laboratory report required.

Lab 3. Use op-amps to build basic inverting, non-inverting and summer circuits. Formal laboratory report required.

Lab 4. Use op-amps to build tuned circuits, oscillators, and LED driver circuits. Formal laboratory report required.

Lab 5. Use a typical microcomputer to work with a DAC or ADC for input/output, or equivalent. Formal laboratory report required.

Lab 6. Use a PLC to control a motor. Formal laboratory report required.