

**PALOMAR COLLEGE**  
**COURSE OUTLINE OF RECORD FOR**  
**DEGREE CREDIT COURSE**

  X   Transfer Course   X   A.A. Degree applicable course  
(check all that apply)

**COURSE NUMBER AND TITLE:** ENGR 210L – Electrical Network Analysis Laboratory

**UNIT VALUE:** 1

**MINIMUM NUMBER OF SEMESTER HOURS:** 16

**BASIC SKILLS REQUIREMENTS:** Appropriate language and computational skills

**ENTRANCE REQUIREMENTS**

**PREREQUISITE:** Completion of, or concurrent enrollment in, ENGR 210

**COREQUISITE:** None

**RECOMMENDED PREPARATION:** None

**SCOPE OF COURSE:**

Laboratory exercises of circuit analysis by reduction methods, source transformations, loop and nodal analysis, OPAMP Model for networks, transient analysis, alternating current circuits, impedance, power and phasor diagrams.

**SPECIFIC COURSE OBJECTIVES:**

The successful student will be able to:

1. Perform electrical circuit analysis using the historical techniques of reduction methods and source transformations.
2. Explain loop and nodal analysis techniques.
3. Describe the OPAMP model for networks.
4. Perform a transient analysis of networks.
5. Describe impedance, power, and phasor concepts in alternating circuits.

**CONTENT IN TERMS OF SPECIFIC BODY OF KNOWLEDGE:**

Selected experiments dealing with the following subject matter:

1. Fundamental Concepts:
  - a. Current
  - b. Voltage
  - c. Power
  - d. Dependent and independent sources

2. Circuit Elements and Variables
  - a. Ohm's Laws
  - b. Kirchhoff's Laws
3. Resistive Circuits
  - a. Source transformation
  - b. Superposition
  - c. Thevenin's Theorem
  - d. Norton's Theorem
4. Network Analysis
  - a. Nodal analysis
  - b. Mesh analysis
5. Inductance and Capacitance
6. Time Response of R-L and R-C Circuits:
  - a. Classical solutions of differential equations
7. Energy and Power:
  - a. Instantaneous and average power
  - b. RMS and average voltage and current
  - c. Complex power
8. Single-Phase AC Circuits
9. Polyphase Circuits:
  - a. Wye and Delta connections
  - b. 3-phase power
10. Topology

Additional topics may be included at instructor's discretion for lecture.

**REQUIRED READING:**

Nilsson, James W., and Susan A. Riedel. Electric Circuits. 5<sup>th</sup> Ed. Reading: Addison-Wesley, 1995.

OR

Dorf, Richard, and James A. Svoboda. Introduction to Electric Circuits. 5<sup>th</sup> Ed. New York: Wiley, 1999.

OR

Carlson, Bruce. Circuits. 1<sup>st</sup> Ed. New York: Brooks/Cole Thomson Learning, 2000.

AND

Mason, Martin. Electric Circuits Laboratory Manual. Palomar College, 2001.

**SUGGESTED READING:** None

**REQUIRED WRITING:**

Problem-solving exercises will be assigned from the text and instructor's handouts. These exercises involve a high degree of analytical and deductive reasoning skill.

**OUTSIDE ASSIGNMENTS:**

Students are expected to spend a minimum of three hours per unit per week in class and on outside assignments, prorated for short-term classes.

The student will be required to read the text, study lecture notes, work problem sets, and other tasks as required by the instructor.

**INSTRUCTIONAL METHODOLOGY:**

Check all that apply:

- lecture
- laboratory
- lecture-laboratory combination
- directed study

**DISTANCE LEARNING:**

This course may be offered as a distance learning course and meets Title 5 regulations 55370, 55372, 55374, 55376, 55378, and 55380.

Yes  No

If yes, check all that apply:

- Television Course (Video one-way, e.g. ITV, video cassette, etc.)
- Online Course (Text one-way, e.g. newspaper, correspondence, electronic file, etc.)
- Two-Way Video Conferencing (Two-way interactive video and audio)
- One-Way Video Conferencing (One-way interactive video and two-way interactive audio)
- Computer Assisted Instruction (A specialized form of mediated instruction relying primarily on student access to information and prepared lessons or teaching materials through a computer terminal, but not under immediate supervision of a qualified instructor.)

**GRADING POLICY AND STANDARDS** (include methods of determining whether the stated objectives have been met by students):

Grades are determined by scores received on laboratory work according to the following plan:

- Lab reports 50 – 100%
- Lab quizzes 0 – 50%
- Other 0 – 25%

**IS COURSE REPEATABLE FOR REASON(S) OTHER THAN DEFICIENT GRADE?**

Yes  No  Number of times course may be taken for credit: 1

If yes, identify specific provision of Title 5 Division 2 section(s), 55761-55763 and 58161 which qualifies course as repeatable:

**CONTACT PERSON:** Martin Mason

**SIGNATURES:**

**By signing this form, I certify that this course outline of record meets all the minimum requirements for associate degree credit courses as specified in Title 5 Section 55002.**

SIGNATURES ON FILE