

1. Department, Course Number, and Course Title:

ELECTRICAL ENGINEERING

EE 210 ELECTRIC MEASUREMENTS LABORATORY

2. Designation: Required Elective
Lower Division Upper Division

3. Course Description: Characteristics and limitations of analog and digital electrical and electronic instrumentation, signal sources, and d-c power supplies. Analysis, tabulations, and graphical presentation of measurement data and technical report writing

4. Prerequisites: PHYS 203, General Physics I

5. Text and Materials: Electric Measurements Laboratory Manual, Sidney Soclof, CSULA

6. Course Objectives: Comprehend, understand, and have fluency in the topics and basic concepts of this course as stipulated in the University Catalog description, the expanded course outline, and the topics as listed here, so as to be able to apply this understanding and knowledge in a variety of open-ended design situations.

Course Outcomes

- ability to analyze rigid bodies subjected to planar and spatial forces and moments
- ability to determine centroids and moments of inertia of rigid bodies
- ability to analyze and/or design simple systems subjected to normal stress, shearing stress, and bearing stress, including statically indeterminate systems subjected to axial loading (tension and compression)
- ability to analyze and/or design simple cylindrical shafts, including statically indeterminate systems, subjected to torsion
- ability to analyze and/or design simple systems subjected to bending and shear
- ability to find the slope and deflection of simple beams
- ability to find principal stress and strain—plane stress/strain transformations
- ability to work independently

7. Topics Covered: (in Order of Presentation)

- Introduction to Electronic Measuring Instruments
- Precision and Accuracy
- Frequency Range
- Input Impedance - Loading Effects
- Signal Sources - Output Impedance
- Digital Multimeters (DMMs)
- DMM Functions
- DMM Resolution (number of digits)
- D-C Power Supplies - Regulation
- Function Generators - Output Waveforms
- Function Generators - Output Impedance
- Function Generators - Sweep Function
- Function Generators - Arbitrary Waveforms
- Oscilloscopes - Basic Operation
- Oscilloscopes - Cursor Measurements
- Frequency Counters

8. Class Schedule: Number of Sessions per week: 1
Duration of each session: 2 hours 50 minutes

9. Contribution of course to meeting the professional component:

This course is part of the 63 units of major requirement for the electrical engineering program.
Engineering Science 1 units

10. Relationship of course to program objectives:

This course relates to the program objectives by contributing to the following measurable outcomes at the level indicated for all engineering graduates:

Knowledge outcomes:

- an ability to apply knowledge of mathematics, science, and engineering (abet a)
- the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context (abet h)
- a knowledge of measurement techniques

Skill outcomes:

- an ability to design and conduct experiments as well as to analyze and interpret data (abet b)
- an ability to function on multidisciplinary teams (abet e)
- an ability to communicate effectively (abet g)
- an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice (abet k)
- an ability to think in a logical sequential process

Attitudes Outcome:

- an understanding of professional and ethical responsibility (abet f)
- a desire to be a flexible and adaptable team player (collaborative attitude)

11. Prepared by:

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