

COURSE OUTLINE

ENSC 251 Circuit Analysis 4 Credit Hours

The Community College of Baltimore County

Description

Circuit Analysis covers circuits consisting of the basic elements: resistors, capacitors, inductors, sources, mutual inductance, and transformers. Applications of Kirchhoff's Laws, the theorems of Thevenin and Norton, node and mesh analysis, DC and AC steady state analysis, phasor analysis, transient analysis and superposition are made. The course includes a laboratory in which the student is expected to design and test circuits using PSPICE and real components.

4 credits; 3 lecture hours per week, 1 credit lab meeting for 2 hours per week. Prerequisite: PHYS 251 and MATH 259(concurrently).

Overall Course Objectives

Upon completion of this course, the student will be able to:

1. Understand circuit variables,
2. Understand the basic circuit elements and their mathematical representations,
3. Perform circuit analysis with Kirchoff's Laws on resistor networks,
4. Perform circuit analysis with Thevenin's Theorem on resistor networks,
5. Perform circuit analysis with Norton's Theorem on resistor networks,
6. Perform circuit analysis with Node/Mesh methods on resistor networks,
7. Understand inductors and capacitor applications,
8. Analyze RLC circuits utilizing phasor methods,
9. Analyze RLC circuits utilizing steady state methods, and
10. Perform circuit analysis including operational amplifiers.

Major Topics

- I. Circuit variables, elements, and conventions
- II. Series and parallel resistor networks
- III. Techniques of circuit analysis
- IV. Op Amps
- V. Capacitors and inductors
- VI. First-order RL and RC circuit responses, and natural and step responses of RLC circuits
- VII. Phasor and sinusoidal steady state analysis

Course Requirements

Grading/exams: Grading procedures will be determined by the individual faculty member but will include the following: a minimum of three examinations, a final examination, and approximately ten laboratory reports.

Writing: Written laboratory reports will be required on a more or less weekly basis. The individual faculty member will determine specific additional writing assignments.

The Community College of Baltimore County is committed to providing a high-quality learning experience that results in growth in knowledge, attitudes, and skills necessary to function successfully as a transfer student, in a career and as a citizen. To accomplish this goal, we maintain high academic standards and expect students to accept responsibility for their individual growth by attending classes, completing all homework and other assignments, participating in class activities and preparing for tests.

We take seriously our responsibility to maintain high quality programs and will periodically ask you to participate in assessment activities to determine whether our students are attaining the knowledge, attitudes and skills appropriate to various courses and programs. The assessment activities may take many different forms such as surveys, standardized or faculty-developed tests, discussion groups or portfolio evaluations. We ask that you take these activities seriously so that we can obtain valid data to use for the continuous improvement of CCBC's course and programs