

TEORIA DE CIRCUITOS ELÉTRICOS

Code: 322120

Main Scientific Area: Technologic innovation

Lecturer: Alexandrino José Fortes da Silva

Language of Instruction: Portuguese

Regime: S1

Contact Hours: 60h Total Workload: 108h

ECTS: 6,0

Objectives

This course is intended to provide students with a sound knowledge of the fundamental principles of electricity as well as knowledge of electronic and electrical equipment.

Learning Outcomes

At the end of the course, students should be able to:

- Know the fundamental electrical units;
- Calculate the equivalent resistance of an electrical circuit;
- Analyze circuits with sources of voltage and current, real and ideal, dependent and independent;
- Analyze circuits with Direct Current;
- Know the existing measurement devices and understand its operation.

Course Contents

1. System of Units

2. Basic concepts

3. Basic circuit elements:

1. Circuit element definition
2. Power consumed/generated by a circuit element
3. Active and passive elements
4. Sources of voltage and current, real and ideal, dependent and independent

4. Basic laws of a circuit:

1. Ohm's law
2. Kirchhoff's laws for current and voltage
3. Resistors association in series and parallel
4. Equivalent resistance concept
5. Equivalent circuits Delta-Star
6. Current and voltage divider

5. Circuit analysis techniques with ideal sources:

1. Fictitious currents method
2. Nodal analysis method
3. Superposition principle
4. Thévenin and Norton theorems

6. Capacitors and Coils

7. Measuring devices

Recommended Bibliography

Circuitos Eléctricos, Vitor Meireles, Lidel, 2003.

Basic Circuit Analysis, 2nd Edition, Hohn O' Malley, McGraw-Hill, 1992.

Circuit Analysis - Theory and Practice, 2nd Edition, Robbins Miller, Thomson Delmar Learning, 2003.

Learning and Teaching Methods

The contents are presented in order to explore the teaching material in a sustainable way to complement the students training in circuit analysis domain, seeking to deepen concepts related to areas of most importance to the activities of design of electronic systems. The content of the proposed program addresses the various aspects essential to the fulfillment of these objectives, particularly with regard to current topics and recent developments.

Assessment Methods

Students will be evaluated in two stages in the form of written test which aims to assess the retention of knowledge. The minimum score on each test is 7.5 points and each will have a 40% of the final grade. It is also considered a practical work on circuit analysis with a 20% of the final grade, encompassing the laboratory observation (individual) and a written report (per group) with equal weights. This component has a minimum score of 9.5 and can only be assessed during the regular season.

The student will be approved when the average of the three evaluation components is greater or equal to 9,5 values, otherwise the students can always submit to the respective exam seasons, this exam have a weight of 100% in final grade with a minimum grade of 9,5 values.

In the first test, if the student does not obtain the minimum grade of 7,5 values, the student can realize one global test (with a weight in final evaluation of 80% and a minimum grade of 7,5 values). This global test is performed on the same date as the second test. The student approved in the first test can always choose to perform the global test (the global test is performed on the same date as the second test), since he abdicates of the classification obtained in the first exam.