

THEORY OF ELECTRICAL CIRCUITS

Code: 322120

Main Scientific Area: Electronics and hardware

Lecturer: Alexandrino José Fortes da Silva

Language of Instruction: Portuguese

Regime: S1

Contact Hours: 60h Total Workload: 108h

ECTS: 6,0

Objectives

This curricular unit presents the electrical quantities, laws and fundamental theorems in the analysis of electrical circuits.

It is intended that students learn to calculate the equivalent resistance of an electrical circuit, analyze circuits with voltage and current sources, real and ideal, dependent and independent, and use different methods of analysis of direct current circuits. It is also intended that students get to know electrical measuring devices, understand how they work and learn to use them.

Learning Outcomes

Students who successfully complete this course should be able to:

Know the fundamental electrical quantities;

Know, understand and apply the fundamental laws and theorems in the analysis of electrical circuits;

Calculate the equivalent resistance of an electrical circuit;

Analyze circuits with voltage and current sources, real and ideal, dependent and independent;

Use different methods of analysis of direct current circuits;

Know the measuring devices of electrical quantities, understand their operation and know how to use them in the laboratory;

Apply the theoretical concepts presented in solving real problems.

Course Contents

1. Unit systems
2. Basic concepts
3. Basic elements of an electrical circuit
4. Fundamental laws of an electrical circuit
5. Circuit analysis techniques with ideal and real sources
6. Capacitors and Coils
7. Measuring devices

Recommended Bibliography

MEIRELES, Vítor, Circuitos Eléctricos, Lidel, 2009.

O'MALLEY, Jonh, Basic Circuit Analysis, 2nd Edition,, McGraw-Hill,1992.

ROBBINS MILLER, Circuit Analysis – Theory and Practice, 2nd Edition,, 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

The final classification of students is obtained based on the following assessment elements:

40% - Written test 1 (minimum grade of 7.5 points)

40% - Written test 2 (minimum grade of 7.5 points)

20% - Practical Work (minimum grade of 9.5 points)

In the first written test, if the student does not obtain the minimum grade of 7.5 values, the student can take a global test (with a weight in the final evaluation of 80% and a minimum grade of 7.5 values). This global written test takes place on the same date as the second written test.

The student approved in the first written test can always choose to take the global test (the global test is carried out on the same date as the second written test), waiving the classification obtained in the first written test.

The student will be approved for the course when the average of the elements (rounding off) is greater than or equal to 9.5 values.