

Physics 2 (elective course)

Introducing

Description

Materials: Introduction to Materials Science

Atomistics (electronic structure)

Structure and concept of order in matter

Crystalline matter (lattices / perfect crystal and real crystal / crystalline defects + concept of microstructure)

Mechanical properties of crystalline materials (tensile test / elastic deformation / plastic deformation / fracture)

Electromagnetism:

Supplementary electrokinetics for magnetostatics

Lorentz force and Laplace force

Magnetostatics (Biot-Savart law, Ampère's theorem)

Introduction to electromagnetism: Quasi-static approximation (ARQS) and induction phenomena

Brief introduction to waves (general concepts, harmonic waves, progressive and stationary waves, interference and diffraction)

Prerequisite: Electrostatics

Supplementary Control Engineering:

This course deals with sequential logic. The general structure of a sequential system and basic sequential systems (counters, flip-flops) are studied. A method for designing synchronous sequential systems with

implementation via flip-flops is covered.

This course prepares for and includes three practical lab sessions.

Objectives

Course Objective:

The aim of this course is to provide students with additional physics knowledge, especially for those who wish to continue their studies in AE (Automatic Engineering) or GP (General Physics).

The course covers three subjects:

Materials:

At the end of this course, students should be able to describe the main macroscopic mechanical properties of materials and identify their microscopic origins related to the structural arrangement of matter.

Electromagnetism:

Introduction to waves and induction phenomena.

Supplementary Control Engineering:

At the end of this module, the student should understand and be able to explain:

The concepts of sequential systems

The methods for designing and implementing these systems

The student should be able to:

Design a sequential logic system

Additionally, the student should have applied the concepts seen in Continuous Control:

System modeling

System performance analysis

Implementation of controllers

Necessary prerequisites

Electrostatics

Combinational Logic

Continuous Control

Évaluation

L'évaluation des acquis d'apprentissage est réalisée en continu tout le long du semestre. En fonction des enseignements, elle peut prendre différentes formes : examen écrit, oral, compte-rendu, rapport écrit, évaluation par les pairs...

Practical info

Location(s)

 Toulouse