## Faculty of Economic, Social and Political Sciences

## INGE1213    Physics

[40h+20h exercises] 5 credits

**Teacher(s):**          Piotr Sobieski
Language:               French
Level:                  First cycle

## Aims

General introduction to electromagnetism and electromagnetic waves

## Main themes

The course is divided into two parts. The first part is a week-by-week presentation of the basic laws of electromagnetism, and their applications. It begins with an introduction to the laws of electrostatics in a vacuum, drawing on concepts studied in Physics 1. Students are shown how these laws are adapted to the study of dielectric and conducting materials. This is followed by lectures on aspects of the theory of circuits and magnetic fields in a vacuum and in matter. This part of the course ends with a study of magnetic induction phenomena and the development of an integrated approach towards the phenomenon of electromagnetism.

The second part expands the concept of waves introduced in Physics 1 to the study of electromagnetic waves and ends with an introduction to optics.

The experimental approach adopted in Physics 1, focused on determining the orders of magnitude in circuits and simple mechanical systems, is pursued in this course.

## Content and teaching methods

Part 1: Electricity and magnetism
- Electrostatics in a vacuum
- Electrostatics in matter
- Ohm's and Kirchhoff's Laws
- Aspects of electric circuits - source, resistance, capacity concepts
- Magnetostatics in a vacuum
- Magnetostatics in matter
- Phenomena of magnetic induction
- Electromagnetic fields
Part 2: Waves and optics
- Electromagnetic waves
- Reflection - polarisation and refraction
- Aspects of optics
Methods:
Lectures backed up by demonstrations, lab work, problem and exercise-centred learning, group work

## Other information (prerequisite, evaluation (assessment methods), course materials recommended readings, ...)

Course entry requirements: Students should have completed Physics 1 (or equivalent) and Mathematics 1 (or equivalent).
Course materials: BENSON Harris, Physics. Electricity and Magnetism Volume 2 and Volume 3 Waves-Optical and modern Physics, French Translation, De Boeck Université. Students wishing to improve their English would do well to use the English version of this work.

## Other credits in programs

**INGE12BA**        Deuxième année de bachelier en ingénieur de gestion            (5 credits)            Mandatory