PHYS-201(e) **General physics: electromagnetism**

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Cursus	Sem.	Type
Chemistry and chemical engineering	BA3	Obl.
Environmental Sciences and Engineering	BA3	Obl.
HES - CGC	H	Obl.
HES - SIE	H	Obl.

Language of teaching	English
Credits	4
Session	Winter
Semester	Fall
Exam	Written
Workload	120h
Weeks	14
Hours	**4 weekly**
Courses	2 weekly
Exercises	2 weekly
Number of positions	

Summary

Introduction to electromagnetism.

Content

Electromagnetism
Electrostatics, electric field and potential. Stationary electrical currents. Magnetostatics.
Electrical and magnetic fields in condensed matter. Polarization and magnetization of matter. Induction, DC motor, electrical circuits with direct currents (DC) or alternating currents (AC).
Basic of Optics: reflection, refraction, lenses, interference, diffraction

Learning Prerequisites

Recommended courses

General physics I, II

Learning Outcomes

By the end of the course, the student must be able to:

- Interpret important phenomena involving electromagnetic interactions
- Realize the beauty and internal consistency of Maxwell's equations
- Predict the consequences of Maxwell's equations in simple but important situations
- Choose to solve problems with static and time-dependent fields
- Manipulate differential operators (gradient, curl, divergence, laplacian)
- Contextualise conservation laws for physical quantities both in local and global form

Transversal skills

- Continue to work through difficulties or initial failure to find optimal solutions.

Teaching methods

Ex cathedra and exercises supervised in class

Assessment methods

Written test (120 min.)