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

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Cursus	Sem.	Type
HES - GM	H	Obl.
Mechanical engineering	BA3	Obl.

Language of teaching	English
Credits	6
Session	Winter
Semester	Fall
Exam	Written
Workload	180h
Weeks	14
Hours	**6 weekly**
Courses	4 weekly
Exercises	2 weekly
Number of positions	

Summary

The course covers the phenomena, concepts and principles of electricity and magnetism illustrating some of their applications. The unity of the electric, magnetic and optical phenomena and the variety of their applications are emphasized.

Content

-Electrostatics: electric field and potential.
-Electric fields in matter.
-Stationary electric currents and AC circuits.
-Magnetostatics: magnetic field and vector potential.
-Magnetic fields in matter.
-Electrodynamics: electromotive force, electromagnetic induction, Maxwell's equations.
-Conservation laws of charge, energy and momentum.
-Electromagnetic waves.

Keywords

electricity and magnetism, electrodynamics, electromagnetic waves

Learning Prerequisites

Required courses

General Physics I, II

Recommended courses

First year mathematics courses

Learning Outcomes

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

- Integrate topics of the course and formulate physical models of electromagnetic phenomena
- Apply concepts given in the course to practical problems in electromagnetism
- Solve problems and manipulate equations using the concepts given in the course
- Describe and predict the behavior of a system using fundamental physical laws

Teaching methods

In person lecture with demonstrations and exercises in class

Expected student activities

Attendance to lectures and exercise classes, completion of exercises, revision of lecture contents by consulting relevant books.

Assessment methods

Final written exam

Supervision

Office hours	No
Assistant.e.s	Yes
Forum	Yes

Resources

Bibliography

Introduction to Electrodynamics, David J. Griffiths
Electricity and Magnetism, Edward M. Purcell and David J. Morin
The Feynman Lectures on Physics Vol. II, Richard Feyman

Ressources en bibliothèque

- Find the references at the Library

Références suggérées par la bibliothèque

- The Feynman Lectures on Physics/ Feynman

Moodle Link

- https://moodle.epfl.ch/course/view.php?idnumber=PHYS-201(b)

Prerequisite for

General physics IV and Electromagnetism II