

Physics

Physics : mechanical and electromagnetic waves

IDENTIFICATION

CODE : PC-S4-PH-TF
ECTS : 4.0

HOURS

Lectures : 7.0 h
Seminars : 31.0 h
Laboratory : 18.0 h
Project : 0.0 h
Teacher-student
contact : 56.0 h
Personal work : 44.0 h
Total : 100.0 h

ASSESSMENT METHOD

Continuous assessment all along the school semester to check acquired knowledge and skills by tests and practical exams.
A final exam will be held at the end of the school semester to evaluate the ability to analyze and solve a problem using the knowledge and skills acquired during the whole year.

TEACHING AIDS

Textbooks with lecture notes, exercises and problems for tutorials and practicals wordings.
Multiple-choice questionnaire for autonomous training and self-assessment are available (French only).

TEACHING LANGUAGE

French

CONTACT

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AIMS

To gain an understanding and to master a lasting knowledge in different areas of Physics (waves in infinite and finite media, interferences), thanks to reflection and to critical mind. This comprehensive knowledge is essential to an engineer education.

To develop a scientific approach to solve theoretical and experimental problems, by implementing a multiple stage approach (observation, questioning, analysis of the problem, experimentation, modelling, interpretation, critical analysis...).

The main skills aimed by this teaching are:

C12 - To reduce a system or a problem by assumptions (hypothesis); C13 - To model a system or a problem by convenient dimensions or objects in relation; C14 - To build a scheme of the system or the problem; C16 - To build a proof; C21 - To compute by graphical resolution an exact or approximate solution; C32 - To acquire experimental data by identifying and evaluating acquisition limits; C51 - To select and implement well-adapted tools to represent and analyze data; C54 - To interpret data in the context of a model

CONTENT

The fourth semester is entirely devoted to the propagation of waves. It contains three chapters. The first chapter concerns the propagation of waves in unlimited media with a first part on mechanical waves and a second part on electromagnetic waves (introduction, propagation equation, impedance, power transported). The second chapter deals with propagation in limited media with the notions of reflection and transmission coefficients, superposition of incident and reflected waves. The last chapter deals with interferences (interference conditions, two-source interference, specificity of light waves).

BIBLIOGRAPHY

All physics books written for first undergraduate cycle.

PRE-REQUISITE

This course will also use the mathematical tools and skills that will be learnt all along the first year, and of course the physics curriculum of the first 3 semesters (dimensions, uncertainties, electricity, mechanics, electromagnetism).

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