

Physics

Physics 5

AIMS

To gain an understanding and to master a lasting knowledge in different areas of Physics of waves, 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

- Waves in infinite media :

Wave introduction : plane, spherical, harmonic waves. Equation of propagation and d'Alembert equation.

Mechanical waves : transversal waves on an infinite rope and longitudinal acoustic waves in an infinite tube. Acoustical and mechanical impedance. Acoustic intensity.

Electromagnetic waves in uncharged media. Electromagnetic impedance. Polarisation.

- Propagation of waves in limited media : transmission and reflexion coefficients + Standing waves

BIBLIOGRAPHY

All physics books written for first undergraduate cycle.

PRE-REQUISITE

Notions learnt during secondary education: calculus, plane geometry, and trigonometric functions, calculation skills (derivatives, anti-derivatives, complex numbers, quadratic equations, systems of linear equations, trigonometry, vectors), statistics (average and standard deviation), data and functions plots.

This teaching will also use the mathematical tools and skills that will be learnt all along the first year.

IDENTIFICATION

CODE : PC-S3-PH-H2
ECTS : 3.0

HOURS

Lectures :	5.0 h
Seminars :	17.0 h
Laboratory :	14.0 h
Project :	0.0 h
Teacher-student contact :	36.0 h
Personal work :	40.0 h
Total :	76.0 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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