Universitat de Lleida

DEGREE CURRICULUM

PHYSICS II

Coordination: CASTELLVI SENTIS, FRANCESC

Academic year 2023-24

PHYSICS II 2023-24

Subject's general information

<table>
<tr><td>Subject name</td><td>PHYSICS II</td></tr>
<tr><td>Code</td><td>102518</td></tr>
<tr><td>Semester</td><td>2nd Q(SEMESTER) CONTINUED EVALUATION</td></tr>
<tr><td>Typology</td><td>
<table>
<tr><th>Degree</th><th>Course</th><th>Character</th><th>Modality</th></tr>
<tr><td>Bachelor's Degree in Agricultural and Food Engineering</td><td>1</td><td>COMMON/CORE</td><td>Attendance-based</td></tr>
</table>
</td></tr>
<tr><td>Course number of credits (ECTS)</td><td>6</td></tr>
<tr><td>Type of activity, credits, and groups</td><td>
<table>
<tr><th>Activity type</th><td>PRALAB</td><td>PRAULA</td><td>TEORIA</td></tr>
<tr><th>Number of credits</th><td>0.8</td><td>1.6</td><td>3.6</td></tr>
<tr><th>Number of groups</th><td>4</td><td>2</td><td>1</td></tr>
</table>
</td></tr>
<tr><td>Coordination</td><td>CASTELLVI SENTIS, FRANCESC</td></tr>
<tr><td>Department</td><td>ENVIRONMENT AND SOIL SCIENCES AND CHEMISTRY</td></tr>
<tr><td>Teaching load distribution between lectures and independent student work</td><td>Master class. 20%.
Activities in class. 30%.</td></tr>
<tr><td>Important information on data processing</td><td>Consult this link for more information.</td></tr>
<tr><td>Language</td><td>Spanish</td></tr>
<tr><td>Distribution of credits</td><td>Master class 60%
Activities 40%</td></tr>
</table>

PHYSICS II 2023-24

Teaching staff	E-mail addresses	Credits taught by teacher	Office and hour of attention
CASTELLVI SENTIS, FRANCESC	francesc.castellvi@udl.cat	6,8	
SOLANS BARON, ALEJANDRO	alejandro.solans@udl.cat	1,6	
TEIXIDO GARCIA, ORIOL	oriol.teixido@udl.cat	1,6	

Subject's extra information

All the information is subject to alterations that may arise from rules imposed due to the COVID -19 pandemic.

The subject aims to achieve different skills related to the understanding of laws and basic concepts of mechanics, thermodynamics, fields, waves, electricity and magnetism to understand and solve problems and facilitate multidisciplinary comprehension. It is not a subject oriented to specific skills, but useful to assimilate new challenges.

Recommendations.

It is recommended to have studied the baccalaureate in science or technology. If you have not taken these courses, it is recommended to take a preparatory course in general physics.

On the other hand, the coordination of the ETSEA establishes the following regulations (approved on September 4, 2014):

1. It is necessary to carry out all the laboratory practices and work to deserve a continuous evaluation. Otherwise, the student will have to pass a final exam.

2. With regard to practical classes (in the classroom and in the laboratory), it is not allowed to modify the groups.

3. It is not allowed to use the mobile in class.

4. Regarding the evaluation. For assessment and attendance, it is necessary to participate in the 80% of the total teaching load.

Learning objectives

The goal is to achieve the following Learning Outcomes:

LO1. Evaluate orders of magnitude to discriminate phenomena that may be irrelevant.

LO2. Identify situations that are physically different show analogies, allowing the use of known solutions to new problems.

LO3. Correctly interpret fundamental laws or principles.

LO4. Know how to locate the physical phenomenon that can be described through them.

LO5. Interpret the essence of a process / situation.

LO6. Establish a work / work model in order to reduce the problem to a manageable level.

LO7. Interpret scientific texts.

LO8. Summarize and present the information in a concise and clear way.

LO9. Develop the ability to work individually and organize to meet deadlines.

LO10. Gain experience in group work and be able to interact constructively in the team.

Competences

Basic skills

CB1. That students have demonstrated to possess and understand knowledge in an area of study that starts from the base of general secondary education, and is usually found at a level that, while supported by advanced textbooks, also includes some aspects involving knowledge from the forefront of their field of study

CB2. That students know how to apply their knowledge to their work or vocation in a professional way and possess the skills that are usually demonstrated through the development and defense of arguments and problem solving within their area of study

CB3. That students have the ability to gather and interpret relevant data (usually within their area of study) to make judgments that include reflection on relevant social, scientific, or ethical issues.

CB4. That students can convey information, ideas, problems and solutions to both specialized and non-specialized audiences

CB5. That students have developed those learning skills necessary to undertake further studies with a high degree of autonomy

Specific skills

CEFB5. Understanding and mastery of the basic concepts about the general laws of thermodynamics, fields, and waves and electromagnetism and their application for solving problems specific to engineering.

Subject contents

Introduction. Development and justification of the subject.

The subject is structured in three thematic blocks:

Block I. Thermodynamics. Heat transfer

SUBJECT 1. BASIC CONCEPTS. Thermodynamic equilibrium concept. Thermometry. Equation of state.

SUBJECT 2.- FIRST PRINCIPLE OF THE THERMODYNAMICS. Heat. Work. Internal Energy. First law of thermodynamics. Applications to closed systems. Stretching a thread. Ideal gas.

SUBJECT 3.- SECOND PRINCIPLE OF THE THERMODYNAMICS. Thermal machines, refrigerators and heat pumps. Performance and efficiency. Carnot cycle. Combustion engines. Stirling cycle. Turbines.

SUBJECT 4.- HEAT TRANSMISSION. Fourier's law. Electrical analogy. Convection. Thermal radiation. Stefan-Boltzmann's law. Wien's law. Newton's law of cooling. Block II. Electrostatics. Field and Electric current SUBJECT 1.- FIELD AND ELECTROSTATIC POTENTIAL. Electrostatic field. Electrostatic potential. Gauss's theorem.

Block II. Electrostatics. Field and Electric current

SUBJECT 1.- FIELD AND ELECTROSTATIC POTENTIAL. Electrostatic field. Electrostatic potential. Gauss's theorem.

SUBJECT 2.- DIELECTRICS. Electrostatics of a conductor. Capacitors. Capacity. Capacitor association. Energy of a capacitor. Dielectrics.

SUBJECT 3.- ELECTRIC CURRENT. DC CIRCUITS. Current intensity and density. Stationary current. Ohm's law. Kirchoff's laws. Cicruit RC.

Block III. Magnetic field. Non-stationary current and circuits

SUBJECT 1.- MAGNETIC FIELD AND ELECTROMAGNETIC INDUCTION. Magnetic field. Magnetic force. Biot and Savart law. Magnetic flux. Electromagnetic induction: Henry-Faraday-Lenz law. Self-induction. Electric generators and motors. Transformers. Hall effects. Elements of a circuit.

SUBJECT 2.- Non-stationary CURRENT. Generator. Ohm's law. Complex impedance. Power. Resonance.

Practical activities:

Block I. Determination of heat capacity. Law of cooling.

Block II. Determining the parameters of a generator. Wheatstone Bridge. Kirchoff's laws.

Methodology

Learning activities

Notation: Hours in classroom (lectures and case studies with problems), C, in the laboratory or computer room, L, and autonomous work (estimated value), AW.

Activities	**Distribution**			
	C	**L**	**AW**	**Total**
Introduction	1			1
Block I				
Lecture 1. Report	3			
Lecture. Report. Lab	4	2		
Lecture 3. Report.	5			
Lecture 4. Report.	5	2		
Summary	**17**	**4**	**8**	**29**
Block II				
Lecture 1. Report	3			
Lecture 2. Report	4			
Lecture 3. Report. Lab	5	6		
Summary	**12**	**6**	**8**	**26**
Block III				
Lecture 1. Report	10			
Lecture 2. Report	10			
Summary	**20**		**10**	**30**
Accumulated	**50**	**10**	**26**	**86**

Development plan

Master classes for theory.

Acitivities can be performed in class and in the lab.

The lab activities are performed in group (two people).

Evaluation

Exams. Weight per exam 20%.

Activities (class and Lab). Total weight, 20%

Bibliography

Tipler, P.A., 1994: Física.Tomos I y II. 3 ed. Ed. Reverté.

Ohanian, H.C., y Markert, J.T., 2010. Física para ingeniería y ciencias. Volúmenes 1 y 2. Ed. Mc Graw Hill.

Dias de Deus, J., M. Pimenta, A. Noronha, T. Peña y P. Brogueira, 2001: Introducción a la Física. Ed. McGraw-Hill. (Pag. web: http://www.mcgraw-hill.pt).

Serway,W.A., 1992: Física. Tomos I y II. Ed. McGraw-Hill

Burbano, S. y E. Burbano, 1995: Problemas de Física. Ed. Librería General.

Castellví, F., P.J. Pérez, M.C.Ramos y J.I. Rosell, 1993: Pràctiques de Física. Ed. PPU - UdL.

Notes. The bibliography is available at the library. The year of publication corresponds to the original version. Later editions can be used (also available in the library).