

Course Guide 33162 Physics

COURSE DATA

Data Subject				
Code	33162			
Name	Physics			
Cycle	Grade			
ECTS Credits	6.0			
Academic year	2020 - 2021			
Study (s)				
Degree		Center	Acad. Period year	
1102 - Degree in Biotechnology		Faculty of Biological Science	s 1 Second term	
1441	and		0.0	
Subject-matter				
Degree		Subject-matter	Character	
1102 - Degree in Biotechnology		78 - Physics	Basic Training	
Coordination				
Name		Department		
ROLDAN GARCIA, CLODOALDO		175 - Applied Physics and Electromagnetism		

SUMMARY

The course "Physics" is a subject of the degree in Biotechnology that is tought in the second semester of the first year and consists of 6 ECTS credits.

Physics is a basic subject in many of the degrees of Sciences. In the case of Biotechnology, the concepts introduced in Physics establish the foundations of many biological processes and some of the most advanced measurement techniques. Within the first year, the course is related to the subjects "Mathematics" and "Chemistry." In more advanced courses the subject Physics allows understanding basic aspects of chemistry and biology.

Experience has shown that the majority of students reaching the first year of studies in the area of "life sciences" have serious deficiencies that affect the performance of students in the subject of Physics. The shortcomings identified are related mainly to the subjects chosen in the options of high school.

Given this evidence we decided to make a physics course in which the contents make clear the connection between physics and life sciences, including in each chapter detailed applications of physics to biological systems. The aim is to motivate the student to demonstrate the clear relationship between these disciplines. For each of the physical quantities introduced in the different chapters we emphasize their physical meaning and their relation with biological systems.



Course Guide 33162 Physics

VNIVERSITATÖDVALÈNCIA

PREVIOUS KNOWLEDGE

Relationship to other subjects of the same degree

There are no specified enrollment restrictions with other subjects of the curriculum.

Other requirements

OUTCOMES

1102 - Degree in Biotechnology

- Saber expresarse correctamente en términos matemáticos, estadísticos, químicos, físicos y biológicos.
- Emplear correctamente herramientas informáticas de cálculo, análisis y representación de datos (hojas de cálculo).
- Dominar bien los cálculos numéricos y el análisis de errores.
- Emplear correctamente y con soltura la calculadora científica y otras herramientas de cálculo.
- Saber aplicar herramientas estadísticas a resultados experimentales.
- Calcular correctamente los parámetros relevantes de un proceso o experimento mediante representación de datos experimentales.
- Ser capaz de resolver problemas de aplicaciones físicas relacionadas con mecánica de fluidos, termodinámica y electricidad.
- Ser capaz de comprender el comportamiento físico de las ondas electromagnéticas y su interacción con la materia.
- Saber relacionar los conocimientos de física nuclear con los efectos de las radiaciones sobre los organismos vivos.

LEARNING OUTCOMES

English version is not available

DESCRIPTION OF CONTENTS

1. Theoretical Unit

Physic of Fluids:

- 1.1 Static of fluids. Surface phenomena.
- 1.2 Dinamic of fluids. Ideal fluids: Bernouilli's equation. Viscous fluids: Poiseuille's equation.
- 1.3 Movement of solids in fluids: sedimentation.



Vniver§itatö́dValència

Course Guide 33162 Physics

Principles of bioelectromagnetism:

- 2.1 Force and electric field.
- 2.2 Electric potential.
- 2.3 The cell membrane. Capacity.
- 2.4 Electric current. Resistance.
- 2.5 DC electric circuits with a mesh,
- 2.6 Magnetic field. Force on a moving charge.
- 2.7 Applications of electric and magnetic fields. Mass spectrometer.

Wave motion:

- 3.1 Wave types.
- 3.2 Equation of wave motion: wavelength, frequency and speed.
- 3.3 Superposition of waves.
- 3.4 Energy and intensity of a wave. Absorption.
- 3.5 Brief introduction to acoustics.

Optics:

- 4.1 The electromagnetic spectrum.
- 4.2 Refractive index. Laws of reflection and refraction.
- 4.3 Diopters and lenses.
- 4.4 Formation of images in lenses.
- 4.5 Instrumental optics: the magnifying glass and the microscope.
- 4.6 The human eye as an optical system.
- 4.7 Defects of the vision.

Radioactivity:

- 5.1 Nuclear structure. Nuclear forces.
- 5.2 Nuclear masses and binding energy.
- 5.3 The radioactive decay and its laws.
- 5.4 Dating in archeology and geology.
- 5.5 Artificial radioactivity. Applications.
- 5.6 Ionizing radiation. Biological effects of radiation. Dosimetric units.

2. Experimental Unit

System of units. Analysis and representation of data. Calculation of uncertainties. Relations between magnitudes: graphic analysis.

Measurement of the density and viscosity of a liquid.

Electrical circuits.

Standing waves.

Formation of images and microscope.

Examination.



Vniver§itatö́dValència

Course Guide 33162 Physics

WORKLOAD

ACTIVITY	Hours	% To be attended
Theory classes	35,00	100
Laboratory practices	15,00	100
Classroom practices	10,00	100
Study and independent work	32,00	0
Preparation of evaluation activities	10,00	0
Preparation of practical classes and problem	39,00	0
Resolution of online questionnaires	9,00	0
ΤΟΤΑΙ	150,00	

TEACHING METHODOLOGY

English version is not available

EVALUATION

Learning assessment:

A continuous evaluation will be carried out based on:

- On-line questionnaires carried out in the Virtual Classroom. The percentage of this part is 5% of the total score.

- The ability to access information, the ability to synthesize and the ability to disseminate the knowledge acquired, which will be assessed through the active participation of students in face-to-face classes and in carrying out tasks related to theoretical and practical content of the subject. These tasks may be requested from students through the tools of the Virtual Classroom. The percentage of this part is 20% of the total score.

- Experimental practices in the laboratory of the subject, that will be evaluated from the memories presented by the students and from an exam that, depending on the circumstances, will be done in person or using the Virtual Classroom tools. The percentage of this part is 25% of the total score. A minimum score of 4 out of 10 is required. It is obligatory to do the laboratory practices.

- An "official" exam that will evaluate the theoretical and practical contents of the subject and that, depending on the circumstances, will be done in person or using the Virtual Classroom tools. This exam will consist of questions and problems. The percentage of this part is 50% of the total score. A minimum score of 4 out of 10 is required.



Vniver§itatö́ dValència



To pass the course, the final averaged score must be greater or equal than 5 out of 10.

REFERENCES

Basic

J.M. Kane, FISICA, Ed. Reverté.
 F. Cussó, C. López, R. Villar, FISICA DE LOS PROCESOS BIOLOGICOS, Ed. Ariel.

Additional

M. Ortuño, FISICA PARA BIOLOGÍA, MEDICINA, VETERINARIA Y FARMACIA, Ed. Critica.
D. Jou, J.E. Llebot, C. Pérez, FISICA PARA LAS CIENCIAS DE LA VIDA, Ed. McGraw Hill.
A.H. Cromer, FISICA PARA LAS CIENCIAS DE LA VIDA, Ed. Reverté.
P.A. Tipler, FISICA (2 volumenes), Ed. Reverté.
A.S. Frumento, BIOFISICA, Ed. Intermédica.
J. Catalá, FISICA, Ed. Saber.

ADDENDUM COVID-19

This addendum will only be activated if the health situation requires so and with the prior agreement of the Governing Council

The teaching plan distribution and the relationship between in-class and non presential activities may be modified throughout the course period if it is required because of the health emergency conditions by Covid-19.