UNIVERSIDAD DE CASTILLA - LA MANCHA

GUÍA DOCENTE

1. General information

Course: PHYSICS
Code: 58300
Type: BASIC
ECTS credits: 9
Degree: 383 - UNDERGRADUATE DEGREE PROGRAMME IN FOOD SCIENCE AND TECHNOLOGY
Academic year: 2022-23
Center: 1 - FACULTY OF SCIENCE AND CHEMICAL TECHNOLOGY
Group(s): 22 24
Year: 1
Duration: AN
Main language: Spanish
Second language:
Use of additional languages:
English Friendly: Y
Web site:
Bilingual: N

Lecturer: **VICTORIANO FERNANDEZ VAZQUEZ** - Group(s): **22**

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Lecturer: **ANGEL MARIA MARTINEZ GARCIA-HOZ** - Group(s): **22**

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2. Pre-Requisites

It is recommended to have successfully taken the subjects of Physics and Mathematics in secondary education

3. Justification in the curriculum, relation to other subjects and to the profession

For a science student, a solid foundation of physics fundamentals is essential, since this discipline is the basis of many applications that will be studied during the degree. The objective is that the student understands the basic principles of mechanics, thermodynamics, electromagnetism and optics; and acquire the skills that allow you to apply them to diverse situations. In the experimental section, the student will become familiar with the practical laboratory and will learn the rudiments of taking and representing scientific data in a professional manner, its analysis, the calculation of errors and operations with physical units.

4. Degree competences achieved in this course

Course competences

Code	Description
CB01	Prove that they have acquired and understood knowledge in a subject area that derives from general secondary education and is appropriate to a level based on advanced course books, and includes updated and cutting-edge aspects of their field of knowledge.
E01	To acquire basic knowledge in chemistry, mathematics, physics to allow the study of the nature of foods, causes of their alteration and fundamentals of their production processes
G02	To possess a correct oral and written communication. To transmit information, ideas, problems and solutions to a both specialized and not specialized public.
G06	To dominate the Technologies of the Information and the Communication (TIC) to user's level, which allows to work in virtual spaces, Internet, electronic databases, as well as with common software packages (e.g. Microsoft Office).
G07	To possess ability of organization and planning, initiative, entrepreneurship and aptitude to be employed in teamworks. To possess capacity of resolution of specific problems of the professional area and to develop the critical reasoning and decision making.
G08	To know the principles and the theories of Basic Science as well as the methodologies and applications of the chemistry, physics, biology and mathematics that are necessary to acquire the specific knowledge of the Degree.

5. Objectives or Learning Outcomes

Course learning outcomes

Description

to develop abstract reasoning.

to learn how to search and select information in the Physics field, to process and show it in an adequate way, both in oral or written form, while developing their ability to synthesis, having a critical, objective attitude.

to have of the basic Physics magnitudes needed to deal with the more complex concepts of Chemistry and Biology which will appear during the degree studies, being able to correlate different concepts.

to master the basic scientific terminology , the use of units and their conversions

to familiarize the student with laboratory work, to learn how to take experimental measurements taking into account the sources of error; to quantify their relevance and express correctly the result of a measurement with both error and units.

to make uniform the knowledge of physics of the class,as well as they are provided with the minimum basis of Physics to be know by any scientist

to learn how to use data analysis software to make profesional presentations of experimental results

In general and in a transversal way, all the values and attitudes inherent in scientific activity will be stirred and promoted in the student.

6. Units / Contents

Unit 1: Kinematics

Unit 2: Particle dynamics

- **Unit 2.1** Newton's laws and fundamental equation of translation dynamics
- **Unit 2.2** Circular movement
- **Unit 2.3** Work and energy
- **Unit 2.4** Collisions

Unit 3: Oscillations

- **Unit 3.1** Simple harmonic motion
- **Unit 3.2** Non-ideal harmonic movements
- **Unit 3.3** Introduction to waves

Unit 4: Fluid mechanics

- **Unit 4.1** Fluid statics
- **Unit 4.2** Fluid dynamics and applications
- **Unit 4.3** Friction in a fluid: Stokes
- **Unit 4.4** Sedimentation and centrifugation

Unit 5: Thermodynamics

- **Unit 5.1** Calorimetry
- **Unit 5.2** First Law of thermodynamics

Unit 6: Electrostatics in a vacuum

- **Unit 6.1** Coulomb law. Electrostatic field
- **Unit 6.2** Electric flow. Gauss's law
- **Unit 6.3** Electric potential and potential energy

Unit 7: Electrostatics in material media and electric current

- **Unit 7.1** Conductors in electrostatic equilibrium.
- **Unit 7.2** Polarization of a dielectric material
- **Unit 7.3** Capacitors
- **Unit 7.4** Electric current. Ohm's law
- **Unit 7.5** Electromotive force. Electric power
- **Unit 7.6** Circuits Kirchhoff's Laws

Unit 8: Static magnetic field

- **Unit 8.1** Magnetic force on free charges and on currents
- **Unit 8.2** Magnetic field sources. Biot-Savart's Law
- **Unit 8.3** Magnetic field circulation. Ampere's Law
- **Unit 8.4** Magnetic field flux. Gauss's law of the magnetic field

Unit 9: Electromagnetic induction

- **Unit 9.1** Faraday-Lenz law
- **Unit 9.2** Induction effects on non-closed circuits
- **Unit 9.3** Applications. The generator and the transformer

Unit 10: Physical optics

- **Unit 10.1** The electromagnetic spectrum
- **Unit 10.2** Light propagation. Refraction and Reflection
- **Unit 10.3** Dispersion
- **Unit 10.4** Polarization
- **Unit 10.5** Interference
- **Unit 10.6** Diffraction

Unit 11: Introduction to the laboratory

7. Activities, Units/Modules and Methodology

Training Activity	Methodology	Related Competences (only degrees before RD 822/2021)	ECTS	Hours	As	Com	Description
Class Attendance (theory) [ON-SITE]	Lectures	CB01 E01 G02	2.2	55	N	-	Teaching of theoretical classes corresponding to the syllabus of the subject. Resolution of practical exercises by both the teacher and the students.
Laboratory practice or sessions [ON-SITE]	Practical or hands-on activities	CB01 E01 G02 G06 G07	0.6	15	Y	Y	In the retake exam, this activity will be recovered with an additional test on the contents and experimental procedures worked in the laboratory.
Workshops or seminars [ON-SITE]	Guided or supervised work	CB01 E01 G02	0.2	5	Y	N	
Group tutoring sessions [ON-SITE]	Group tutoring sessions	E01 G02 G06 G07	0.4	10	N	-	
Other off-site activity [OFF-SITE]	Self-study	E01 G02	3.75	93.75	N	-	Documentation, training, learning and practical cases solving
Study and Exam Preparation [OFF-SITE]	Self-study	E01 G02	1.65	41.25	N	-	
Mid-term test [ON-SITE]	Assessment tests	CB01 E01 G02 G06 G07 G08	0.2	5	Y	Y	The final test consists of TWO DIFFERENTIATED PARTIAL TESTS
		Total:	**9**	**225**			

Total credits of in class work: 3.6	Total class time hours: 90
Total credits of out of class work: 3.4	Total hours of out of class work: 135

As: Assessable training activity
Com: Training activity of compulsory overcoming (It will be essential to overcome both continuous and non-continuous assessment).

8. Evaluation criteria and Grading System

Evaluation System	Continuous assessment	Non-continuous evaluation*	Description
Mid-term tests	35.00%	42.50%	FINAL EXAM CORRESPONDING TO TOPICS 1 TO 5. A partial liberatory exam will be carried out at the end of the first semester. The final and retake exams of the will consist of two differentiated partials that are will be assessed separately and the student will only be examined from the subject corresponding to the partial exams in which the minimum grade of 4 points has not been passed. In the tests will assess the correct understanding of the basic concepts of the subject as well as its application in the reasoned resolution of practical exercises. (Mandatory and recoverable activity)
Mid-term tests	35.00%	42.50%	FINAL EXAM CORRESPONDING TO TOPICS 6 TO 10. A partial liberatory exam will be carried out at the end of the first semester. The final and retake exams of the will consist of two differentiated partials that are will be assessed separately and the student will only be examined from the subject corresponding to the partial exams in which the minimum grade of 4 points has not been passed. In the tests will assess the correct understanding of the basic concepts of the subject as well as its application in the reasoned resolution of practical exercises. (Mandatory and recoverable activity)
Other methods of assessment	15.00%	0.00%	Various evaluation activities: questionnaires, problem solving, seminars, ...
Laboratory sessions	15.00%	15.00%	Attitude in the laboratory, participation in data analysis seminars and preparation of practice reports
Total:	**100.00%**	**100.00%**	

According to art. 4 of the UCLM Student Evaluation Regulations, it must be provided to students who cannot regularly attend face-to-face training activities the passing of the subject, having the right (art. 12.2) to be globally graded, in 2 annual calls per subject , an ordinary and an extraordinary one (evaluating 100% of the competences).

Evaluation criteria for the final exam:

Continuous assessment:

There will be two partial exams, one in each semester. The partial exams will allow releasing material for the final exams if their grade is equal to or greater than 4. The final exam will consist of two differentiated partial exams, and students must examine the partial exams in which they have obtained a grade lower than 4, optionally they may also examine yourself to raise the mark of the passed partials. If the laboratory is passed with a grade higher than 4 and a grade higher than 4 is obtained in both partial exams, either during the course or in the final exam, the above weighting factors ((35+35)% exam, 15% laboratory and 15% activities) will be applied to obtain the final grade for the course. If the above conditions are not met, the final grade that will appear in the report will be the final exam grade (average of the partials) if it is not higher than 4 or 4 otherwise.

Non-continuous evaluation:

The final exam will consist of two differentiated partial exams and in the case that the minimum grade of 4 has not been obtained in the laboratory, an additional test on the content and procedures treated in the laboratory. If a grade equal to or greater than 4 is obtained in the two partial tests of the final test and in the laboratory test, the previous weighting factors will be applied ((42.5 + 42.5)% test and 15% laboratory) to obtain the final mark of the subject. If the above conditions are not met, the final grade that will appear in the minutes will be the grade of the partial if it is not higher than 4 or 4 otherwise.

Specifications for the resit/retake exam:

Same criteria as in the final exam. Those students with a grade lower than 4 in the laboratory must take an additional test on the contents and procedures worked in the laboratory that must be passed with a grade equal to or greater than 4, to pass the course.

Specifications for the second resit / retake exam:

The mark for the second resit will be 85% of the exam mark plus 15% of the laboratory mark. If a grade lower than 4 has been obtained in the laboratory, an additional test will be carried out on the contents and procedures treated in the laboratory.

9. Assignments, course calendar and important dates

Not related to the syllabus/contents

Hours **hours**

Unit 1 (de 11): Kinematics

Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	5
Other off-site activity [AUTÓNOMA][Self-study]	9
Study and Exam Preparation [AUTÓNOMA][Self-study]	4

Group 22:

Initial date: 26-09-2022 **End date:** 06-10-2022

Comment: The laboratory practices will be developed in the second semester according to the calendar published by the faculty: February 20 to 24, March 27 to 31 and April 10 to 15.

Unit 2 (de 11): Particle dynamics

Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	7
Workshops or seminars [PRESENCIAL][Guided or supervised work]	1
Group tutoring sessions [PRESENCIAL][Group tutoring sessions]	2
Other off-site activity [AUTÓNOMA][Self-study]	12.5
Study and Exam Preparation [AUTÓNOMA][Self-study]	5.5
Mid-term test [PRESENCIAL][Assessment tests]	.5
Group 22:	
Initial date: 07-10-2022	**End date:** 28-10-2022

Unit 3 (de 11): Oscillations	
Activities	**Hours**
Class Attendance (theory) [PRESENCIAL][Lectures]	5
Group tutoring sessions [PRESENCIAL][Group tutoring sessions]	1
Other off-site activity [AUTÓNOMA][Self-study]	7.75
Study and Exam Preparation [AUTÓNOMA][Self-study]	3.25
Group 22:	
Initial date: 31-10-2022	**End date:** 15-11-2022

Unit 4 (de 11): Fluid mechanics	
Activities	**Hours**
Class Attendance (theory) [PRESENCIAL][Lectures]	6
Workshops or seminars [PRESENCIAL][Guided or supervised work]	1
Group tutoring sessions [PRESENCIAL][Group tutoring sessions]	2
Other off-site activity [AUTÓNOMA][Self-study]	7.75
Study and Exam Preparation [AUTÓNOMA][Self-study]	3.25
Group 22:	
Initial date: 16-11-2022	**End date:** 13-12-2022

Unit 5 (de 11): Thermodynamics	
Activities	**Hours**
Class Attendance (theory) [PRESENCIAL][Lectures]	5
Group tutoring sessions [PRESENCIAL][Group tutoring sessions]	1
Other off-site activity [AUTÓNOMA][Self-study]	6.25
Study and Exam Preparation [AUTÓNOMA][Self-study]	2.75
Mid-term test [PRESENCIAL][Assessment tests]	2
Group 22:	
Initial date: 14-11-2022	**End date:** 13-01-2023

Unit 6 (de 11): Electrostatics in a vacuum	
Activities	**Hours**
Class Attendance (theory) [PRESENCIAL][Lectures]	6
Other off-site activity [AUTÓNOMA][Self-study]	8.5
Study and Exam Preparation [AUTÓNOMA][Self-study]	3.5
Group 22:	
Initial date: 30-01-2023	**End date:** 19-02-2023

Unit 7 (de 11): Electrostatics in material media and electric current	
Activities	**Hours**
Class Attendance (theory) [PRESENCIAL][Lectures]	5
Workshops or seminars [PRESENCIAL][Guided or supervised work]	1
Group tutoring sessions [PRESENCIAL][Group tutoring sessions]	1
Other off-site activity [AUTÓNOMA][Self-study]	9
Study and Exam Preparation [AUTÓNOMA][Self-study]	4
Group 22:	
Initial date: 14-02-2023	**End date:** 02-03-2023

Unit 8 (de 11): Static magnetic field	
Activities	**Hours**
Class Attendance (theory) [PRESENCIAL][Lectures]	4
Other off-site activity [AUTÓNOMA][Self-study]	5.5
Study and Exam Preparation [AUTÓNOMA][Self-study]	4
Mid-term test [PRESENCIAL][Assessment tests]	.5
Group 22:	
Initial date: 03-03-2023	**End date:** 14-03-2023

Unit 9 (de 11): Electromagnetic induction	
Activities	**Hours**
Class Attendance (theory) [PRESENCIAL][Lectures]	6
Workshops or seminars [PRESENCIAL][Guided or supervised work]	1
Group tutoring sessions [PRESENCIAL][Group tutoring sessions]	2
Other off-site activity [AUTÓNOMA][Self-study]	9.75
Study and Exam Preparation [AUTÓNOMA][Self-study]	3.75
Group 22:	
Initial date: 15-03-2023	**End date:** 17-04-2023

Unit 10 (de 11): Physical optics	
Activities	**Hours**
Class Attendance (theory) [PRESENCIAL][Lectures]	6

Workshops or seminars [PRESENCIAL][Guided or supervised work]	1
Group tutoring sessions [PRESENCIAL][Group tutoring sessions]	1
Other off-site activity [AUTÓNOMA][Self-study]	8.75
Study and Exam Preparation [AUTÓNOMA][Self-study]	7.25
Mid-term test [PRESENCIAL][Assessment tests]	2
Group 22:	
Initial date: 18-04-2023	**End date:** 12-05-2023

Unit 11 (de 11): Introduction to the laboratory	
Activities	**Hours**
Laboratory practice or sessions [PRESENCIAL][Practical or hands-on activities]	15
Other off-site activity [AUTÓNOMA][Self-study]	9
Group 22:	
Initial date: 30-01-2023	**End date:** 12-05-2023

Global activity	
Activities	**hours**
Class Attendance (theory) [PRESENCIAL][Lectures]	55
Other off-site activity [AUTÓNOMA][Self-study]	93.75
Laboratory practice or sessions [PRESENCIAL][Practical or hands-on activities]	15
Workshops or seminars [PRESENCIAL][Guided or supervised work]	5
Group tutoring sessions [PRESENCIAL][Group tutoring sessions]	10
Study and Exam Preparation [AUTÓNOMA][Self-study]	41.25
Mid-term test [PRESENCIAL][Assessment tests]	5
Total horas:	225

10. Bibliography and Sources

Author(s)	Title/Link	Publishing house	Citv	ISBN	Year	Description
Tipler, Paul Allen	Física para la ciencia y la tecnología. Vol. II Electricidad y magnetismo / Luz	Reverté		978-84-291-4430-7	2012	
Young, Freedman	Física universitaria Vol. II (Sears y Zemansky, 14ª ed)	Pearson		9786073244404	2019	Electromagnetismo, óptica y física moderna
Young, Freedman	Física universitaria Vol. I (Sears y Zemansky, 14ª ed)	Pearson		9786073244398	2019	Mecánica, ondas/acústica y termodinámica.
Ángel Peña Sainz y José Antonio García Pérez	Física 2 (Bachillerato)	McGraw-Hill/Interamericana de España, S.A.U.		978-84-481-7027-1	2009	2º Bachillerato
A. Pozas	Física y química 1 : [Bachillerato]	McGraw-Hill, Interamericana de España		84-481-3408-7	2005	1º Bachillerato
Burbano de Ercilla, Santiago	Problemas de física	Tébar		978-84-95447-27-2	2007	
González, Félix A. (González Hernández)	La fisica en problemas	Tebar Flores		84-7360-141-6	1995	
Hewitt, Paul G.	Física conceptual	Pearson Educación		970-26-0447-8	2004	
Serway, Raymond A.	Física para ciencias e ingenierías	International Thomson		970-686-423-7(v.1)	2009	
Tipler, Paul Allen	Física para la ciencia y la tecnología. Vol. I Mecánica / Oscilaciones y Ondas / Termodinámica	Reverté		978-84-291-4429-1	2012	
Young, Hugh D.	University physics : with modern physics tecnology update /	Pearson Education,		978-1-292-10031-9	2016	
Tipler, Paul Allen	Physics for scientists and engineers	W. H. Freeman		978-1-4292-0132-2 (v	2008	