

**1. General information**

Course: PHYSICS  
Type: BASIC  
Degree: 409 - CHEMISTRY  
Center: 1 - FACULTY OF SCIENCE AND CHEMICAL TECHNOLOGY  
Year: 1

Main language: Spanish  
Use of additional languages:  
Web site:

Code: 57302  
ECTS credits: 12  
Academic year: 2022-23  
Group(s): 20 23  
Duration: AN  
Second language:  
English Friendly: Y  
Bilingual: N

Lecturer: MIGUEL ANGEL ARRANZ MONGE - Group(s): 20 23				
Building/Office	Department	Phone number	Email	Office hours
Fac. CC y Tecnologías Químicas	FÍSICA APLICADA	6281	miguelangel.arranz@uclm.es	Mondays and Wednesdays: from 17:00 to 20:00
Lecturer: RICARDO LOPEZ ANTON - Group(s): 20 23				
Building/Office	Department	Phone number	Email	Office hours
Fac. CC y Tecnologías Químicas	FÍSICA APLICADA	3481	ricardo.lopez@uclm.es	send an email to arrange an appointment
Lecturer: JOSÉ CARLOS MENA ARROYO - Group(s): 20 23				
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**2. Pre-Requisites**

It is advised to have a solid background in Physics equivalent to the acquired in the Scientific-Technological high school: Physical magnitudes and Units, Kinematics, Dynamics and Electromagnetism. It is also convenient to know some concepts of Mathematical Analysis: derivatives, integrals and so on.

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

This subject develops the contents of Physical Sciences in the basic formation module of the Chemistry Degree. It is closely related to other fundamental sciences as Mathematics and Chemistry and it provides background for other subjects of higher courses as Materials Science and Chemistry Physics. In order to know more about its relationship with other subjects of the degree and to the professional activity, the memory of the Chemistry degree of the UCLM should be consulted.

**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.
E17	Develop the ability to relate to each other the different specialties of Chemistry, as well as this one with other disciplines (interdisciplinary character)
G01	Know the principles and theories of Chemistry, as well as the methodologies and applications characteristic of analytical chemistry, physical chemistry, inorganic chemistry and organic chemistry, understanding the physical and mathematical bases that require
T02	Domain of Information and Communication Technologies (ICT)
T08	Skills in interpersonal relationships
T11	Ability to obtain bibliographic information, including Internet resources

**5. Objectives or Learning Outcomes****Course learning outcomes**

## Description

Have the basic physical quantities necessary to face the most advanced chemistry concepts that will appear throughout the degree, being able to establish relationships between the different concepts

Master the basic scientific terminology as well as the management of units and their conversions.

In general and in a transversal way, all those values  $\zeta$  and attitudes inherent to scientific activity will be raised and promoted in the student.

Familiarization with laboratory work: learn to take experimental measures by controlling the sources of error, quantify their scope and correctly express the result of a measurement accompanying error and units.

Homogenize the physics knowledge of the class, while providing them with the minimum physics base that every scientist should have

Develop abstract reasoning

Learn to search for and select information in the field of Physics, to process it and present it properly, both orally and in writing, developing its capacity for synthesis, being critical and objective.

Learn to solve complex problems that require to relate different branches of the studied physics and interpret the results obtained.  
Learn to use data analysis software to prepare professional presentations of your experimental results

## 6. Units / Contents

### Unit 1: Introduction to Physical Sciences

### Unit 2: Point Kinematics

### Unit 3: Dynamics of a particle

### Unit 4: Dynamics of a particle system

**Unit 4.1** Newton's Laws. Conservation theorems

**Unit 4.2** The rigid solid

**Unit 4.3** Fluids

### Unit 5: Elastic interaction

**Unit 5.1** Simple harmonic motion

**Unit 5.2** Mechanical waves

### Unit 6: Electric field

**Unit 6.1** Electric field in a vacuum

**Unit 6.2** Electric field in matter

### Unit 7: Electric current

### Unit 8: Magnetic field

**Unit 8.1** Static magnetic field

**Unit 8.2** Time-dependent electromagnetic fields

### Unit 9: Introduction to electromagnetic waves and Optics

**Unit 9.1** Maxwell's equations and electromagnetic waves

**Unit 9.2** Introduction to Optics

### Unit 10: Introduction to the Physics laboratory

**Unit 10.1** Measurement theory and analysis

**Unit 10.2** Experiments on Mechanics

**Unit 10.3** Experiments on Electromagnetism

## 7. Activities, Units/Modules and Methodology

Training Activity	Methodology	Related Competences	ECTS	Hours	As	Com	Description
Class Attendance (theory) [ON-SITE]	Lectures	CB01 E17 G01	3.36	84	N	-	Teaching of theoretical classes corresponding to the syllabus of the subject. Solving practical exercises by both the teacher and the students.
Class Attendance (practical) [ON-SITE]	Practical or hands-on activities	CB01 E17 G01 T02 T08	0.8	20	Y	Y	Practical classroom teaching (laboratory)
Mid-term test [ON-SITE]	Assessment tests	CB01 E17 G01 T02 T08 T11	0.3	7.5	Y	Y	Written exams
Other off-site activity [OFF-SITE]	Self-study	CB01 E17 G01 T02 T11	5.7	142.5	N	-	Documentation, preparation, learning and resolution of practical cases
Study and Exam Preparation [OFF-SITE]	Self-study	CB01 E17 G01	1.84	46	N	-	Preparation and accomplishment of examinations
<b>Total:</b>			<b>12</b>	<b>300</b>			
<b>Total credits of in-class work: 4.46</b>			<b>Total class time hours: 111.5</b>				
<b>Total credits of out of class work: 7.54</b>			<b>Total hours of out of class work: 188.5</b>				

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	80.00%	0.00%	Each mid-term exam (one per term) is divided in five exams distributed along the semester. These periodic exams will consist of a theoretical part (contents exposed in the master classes) and a practical part (resolution of exercises). The evaluation of the student's knowledge through these exams is automatically equivalent to the ordinary call or final test (and substitutes it).
Final test	0.00%	80.00%	The final test is an alternative to mid-term exams
Laboratory sessions	20.00%	20.00%	Except for official cause and duly justified by the student, their completion is mandatory, and the student must succeed in this part in order to succeed in the subject. The student must carry out at least one Mechanics and one Electromagnetism experience, write the respective reports and, later, publicly expose or defend the conclusions of above works.
<b>Total:</b>	<b>100.00%</b>	<b>100.00%</b>	

According to art. 6 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. 13.2) 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:**

The course is divided into two semesters: Mechanics and Electromagnetism.

To be evaluated in the ordinary call, the student must select one of the following itineraries (although no change can be made once the second term starts):

1) Evaluation through mid-term exams (see above). Each semester includes practical and theoretical controls, their grade being the weighted average of these exercises (each teacher will detail this weight on the first day of class). Subsequently, the final grade for the course will be the average of each semester as long as marks equal to or greater than four have been obtained in both parts. The course will be considered approved when the final grade is equal to or greater than five. This mark corresponds to the 80% of the final mark, with the other 20 % corresponding to the mark obtained in the laboratory sessions.

2) Evaluation through the final exam. (It is described below).

Regardless of the chosen itinerary, only once the ordinary call has been approved will the laboratory practice grade be taken into account to calculate the final grade in the certificate. In any case, the student must succeed also in the laboratory sessions in order to successfully pass the subject.

**Non-continuous evaluation:**

On the official date of the ordinary call, the student must take an exam (called final test) divided into two parts, as many as semesters. In each of them, you must answer two practical exercises and various theoretical questions according to the subject's syllabus. The final grade of the final test will be the average of both parts, provided that both equals or exceeds four. If that qualification is equal or higher than five, that mark corresponds to the 80% of the final mark and the other 20% corresponds to the laboratory sessions. If the student has not performed the laboratory sessions (only due to a duly justified cause), the student must additionally take a theoretical-practical laboratory exam. Once this laboratory test has been passed, its marks gives the 20% of the final mark (corresponding to the laboratory sessions)

**Specifications for the resit/retake exam:**

The extraordinary exam will be of the same type as the final exam of the ordinary call (Mechanics and Electromagnetism, with theoretical and practical questions).

Students who have not succeeded in the ordinary call must appear in addition to this final exam (extraordinary call). As considered, the student can sit the full exam, or only to the part of the semester where the previous grade was less than four.

For the students who did not perform the laboratory sessions (due to a duly justified cause) and who had not successfully passed the theoretical-practical laboratory exam of the ordinary call, a new theoretical-practical laboratory exam will be offered to them.

The rest of the evaluation criteria are identical to those of the ordinary call.

**Specifications for the second resit / retake exam:**

The design of the written test and its evaluation criteria are the same as in the ordinary call (non-continuous option).

9. Assignments, course calendar and important dates	
Not related to the syllabus/contents	
Hours	hours
<b>Unit 1 (de 10): Introduction to Physical Sciences</b>	
<b>Activities</b>	<b>Hours</b>
Class Attendance (theory) [PRESENCIAL][Lectures]	3
Other off-site activity [AUTÓNOMA][Self-study]	14.25
Study and Exam Preparation [AUTÓNOMA][Self-study]	4.6
<b>Unit 2 (de 10): Point Kinematics</b>	
<b>Activities</b>	<b>Hours</b>
Class Attendance (theory) [PRESENCIAL][Lectures]	9
Other off-site activity [AUTÓNOMA][Self-study]	14.25
Study and Exam Preparation [AUTÓNOMA][Self-study]	4.6
<b>Unit 3 (de 10): Dynamics of a particle</b>	
<b>Activities</b>	<b>Hours</b>
Class Attendance (theory) [PRESENCIAL][Lectures]	9
Other off-site activity [AUTÓNOMA][Self-study]	14.25
Study and Exam Preparation [AUTÓNOMA][Self-study]	4.6
<b>Unit 4 (de 10): Dynamics of a particle system</b>	
<b>Activities</b>	<b>Hours</b>
Class Attendance (theory) [PRESENCIAL][Lectures]	9
Other off-site activity [AUTÓNOMA][Self-study]	14.25
Study and Exam Preparation [AUTÓNOMA][Self-study]	4.6
<b>Unit 5 (de 10): Elastic interaction</b>	
<b>Activities</b>	<b>Hours</b>
Class Attendance (theory) [PRESENCIAL][Lectures]	9
Other off-site activity [AUTÓNOMA][Self-study]	14.25
Study and Exam Preparation [AUTÓNOMA][Self-study]	4.6
<b>Unit 6 (de 10): Electric field</b>	
<b>Activities</b>	<b>Hours</b>
Class Attendance (theory) [PRESENCIAL][Lectures]	9
Other off-site activity [AUTÓNOMA][Self-study]	14.25
Study and Exam Preparation [AUTÓNOMA][Self-study]	4.6
<b>Unit 7 (de 10): Electric current</b>	
<b>Activities</b>	<b>Hours</b>
Class Attendance (theory) [PRESENCIAL][Lectures]	9
Other off-site activity [AUTÓNOMA][Self-study]	14.25
Study and Exam Preparation [AUTÓNOMA][Self-study]	4.6
<b>Unit 8 (de 10): Magnetic field</b>	
<b>Activities</b>	<b>Hours</b>
Class Attendance (theory) [PRESENCIAL][Lectures]	9

Other off-site activity [AUTÓNOMA][Self-study]	14.25
Study and Exam Preparation [AUTÓNOMA][Self-study]	4.6
<b>Unit 9 (de 10): Introduction to electromagnetic waves and Optics</b>	
<b>Activities</b>	<b>Hours</b>
Class Attendance (theory) [PRESENCIAL][Lectures]	9
Other off-site activity [AUTÓNOMA][Self-study]	14.25
Study and Exam Preparation [AUTÓNOMA][Self-study]	4.6
<b>Unit 10 (de 10): Introduction to the Physics laboratory</b>	
<b>Activities</b>	<b>Hours</b>
Class Attendance (theory) [PRESENCIAL][Lectures]	9
Class Attendance (practical) [PRESENCIAL][Practical or hands-on activities]	20
Mid-term test [PRESENCIAL][Assessment tests]	7.5
Other off-site activity [AUTÓNOMA][Self-study]	14.25
Study and Exam Preparation [AUTÓNOMA][Self-study]	4.6
<b>Global activity</b>	
<b>Activities</b>	<b>hours</b>
Class Attendance (theory) [PRESENCIAL][Lectures]	84
Class Attendance (practical) [PRESENCIAL][Practical or hands-on activities]	20
Mid-term test [PRESENCIAL][Assessment tests]	7.5
Other off-site activity [AUTÓNOMA][Self-study]	142.5
Study and Exam Preparation [AUTÓNOMA][Self-study]	46
<b>Total horas: 300</b>	

10. Bibliography and Sources							
Author(s)	Title/Link	Publishing house	Citv	ISBN	Year	Description	
Alonso, M y Finn, Edward J.	Física (Tomos I y II)	Addison-Wesley		0-201-62565-2	2007		
Burbano de Ercilla, Santiago	Problemas de física	Tébar		978-84-95447-27-2	2007		
González, F.A.	Problemas de física	Tébar Flores		84-7360-026-6	1994		
Olga Alcaraz I Sendra; José López López; Vicente López Solanas	Física: problemas y ejercicios resueltos	Pearson		8420544477	2005		
Sears, Francis W.	Física universitaria	Addison-Wesley Iberoamericana		978-607-33-2124-5	2013		
Serway, Raymond A.	Física: para ciencias e ingenierías	Thomson		970-686-423-7	2005		
Tipler, Paul Allen	Física para la ciencia y la tecnología	Reverté		978-84-291-4428-4	2012		
Hugh Young, Roger Freedman, Francis Sears, Mark Zemansky	University Physics	Pearson		978-8131758625	2016		
R. Serway	Physics for scientists and engineers (10th ed.)	NATIONAL GEOGRAPHIC LEARNING		9781337553278	2017		
Paul A. Tipler	Physics for scientists and engineers (6th ed.)	W.H. FREEMAN & COMPANY		9781429202657			