



# UNIVERSIDAD DE CASTILLA - LA MANCHA

## GUÍA DOCENTE

### 1. General information

Course: APPLIED PHYSICS IN PHARMACY

Type: BASIC

Degree: 376 - UNDERGRADUATE DEGREE PROGRAMME IN PHARMACY

Center: 14 - FACULTY OF PHARMACY

Year: 1

Main language: Spanish

Use of additional  
languages:

Web site:

Code: 14301

ECTS credits: 6

Academic year: 2022-23

Group(s): 10

Duration: First semester

Second language:

English Friendly: Y

Bilingual: N

Lecturer: <b>JOAN MIQUEL GALVE ROMERO</b> - Group(s): 10				
Building/Office	Department	Phone number	Email	Office hours
Escuela Politécnica de Cuenca/IDR	FÍSICA APLICADA	+34926053217	joanmiquel.galve@uclm.es	It will be published at the beginning of the course
Lecturer: <b>JOSE GONZALEZ PIQUERAS</b> - Group(s): 10				
Building/Office	Department	Phone number	Email	Office hours
ETSIAM/IDR	FÍSICA APLICADA	+34926053237	jose.gonzalez@uclm.es	It will be published at the beginning of the course
Lecturer: <b>JESUS RUIZ FELIPE</b> - Group(s): 10				
Building/Office	Department	Phone number	Email	Office hours
Facultad Farmacia	FÍSICA APLICADA		Jesus.RuizFelipe@uclm.es	It will be published at the beginning of the course
Lecturer: <b>JUAN MANUEL SANCHEZ TOMAS</b> - Group(s): 10				
Building/Office	Department	Phone number	Email	Office hours
Facultad de Farmacia/1.12.01	FÍSICA APLICADA	+34926052442	juanmanuel.sanchez@uclm.es	It will be published at the beginning of the course

### 2. Pre-Requisites

Knowledge of mathematics with a high school level

Desirable to have studied Physics in last high school courses.

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

Physics Applied to Pharmacy, located in module 2, aims to offer basic training on natural phenomena that can be used as a basis for other subjects of the degree, especially those in the branch of chemistry.

### 4. Degree competences achieved in this course

Course competences	
Code	Description
B01	Proficiency in a second foreign language at level B1 of the Common European Framework of Reference for Languages.
B02	Knowledge of Information and Communication Technologies (ICT).
B03	A correct oral and written communication
B04	Ethical commitment and professional deontology.
B05	Ability to develop those learning skills necessary to undertake further studies.
EF01	Know the stability of the active ingredients and pharmaceutical forms as well as the study methods
EF04	Identify and to evaluate the potential pharmacokinetic interactions between the active pharmaceutical ingredients and medicines
EQ06	Know and understand the characteristics of chemical reactions in solution, the different states of matter and the principles of thermodynamics and their application to pharmaceutical sciences.
G01	Identify, design, obtain, analyze, control and produce drugs and medicines, as well as other products and raw materials of sanitary interest for human or veterinary use.
G02	Evaluate the therapeutic and toxic effects of substances with pharmacological activity.
G03	Know how to apply the scientific method and acquire skills in the handling of legislation, sources of information, bibliography, elaboration of protocols and other aspects considered necessary for the design and critical evaluation of preclinical and clinical trials.
G04	Design, prepare, supply and dispense medicines and other products of health interest.
G05	Provide therapeutic advice in pharmacotherapy and dietotherapy, as well as in the nutritional and food field in the establishments where they provide services.
G06	Promote the rational use of medicines and medical devices, as well as to acquire basic knowledge in clinical management, health economics and the efficient use of health resources.
G07	Identify, evaluate and assess problems related to drugs and medicines, as well as participate in pharmacovigilance activities.
G08	Conducting clinical and social pharmacy activities, following the pharmaceutical care cycle.
G09	Intervene in health promotion and disease prevention activities at the individual, family and community levels, with an integral and multi-professional vision of the health-disease process.
G10	Design, apply and evaluate clinical reagents, methods and analytical techniques, knowing the basic principles of clinical analysis and the characteristics and contents of laboratory diagnostic reports.
G11	Evaluate the toxicological effects of substances and design and apply appropriate tests and trials.
G12	Develop hygienic-sanitary analyses, especially those related to food and environment.
G13	Develop communication and information skills, both oral and written, to deal with patients and users of the centre where they carry out their professional activity. Promote the capacity to work and collaborate with multidisciplinary teams and those related to other health professionals.
G14	Know the ethical and deontological principles according to the legislative, regulatory and administrative provisions governing professional

G15	practice, understanding the ethical implications of health in a changing social context. Recognise own limitations and the need to maintain and update professional competence, with particular emphasis on self-learning of new knowledge based on scientific evidence.
T01	Critical thinking skills based on the application of the scientific method
T02	Ability to manage quality scientific information, bibliography, specialized databases and resources accessible through the Internet.
T03	Handling of basic and specific software for the treatment of information and experimental results.
T04	Motivation for quality, safety at work and awareness of environmental issues, with knowledge of the internationally recognised systems for the correct management of these aspects.
T05	Organizational, planning and implementation skills.
T06	Ability to address human resources decision-making and management.
T07	Ability to work as a team and, where appropriate, exercise leadership functions, encouraging entrepreneurship.
T08	Develop interpersonal skills and the ability to function in an international and multicultural context.

## 5. Objectives or Learning Outcomes

### Course learning outcomes

#### Description

Understand the aspects related to fluid mechanics (gases and liquids), electricity, wave phenomena and thermodynamics principles, applicable to the study of biological and pharmaceutical processes.

Self-learning: organization capacity, ability to analyze and to manage the information.

Management of basic laboratory instrumentation, based on physical principles and/or used to measure fundamental physical properties.

To know and apply the International System of units to express the physical quantities, their measurements and errors.

Critical thinking.

Teamwork: planning a job, obtaining data and analyzing results.

## 6. Units / Contents

### Unit 1: Introduction to Physics

### Unit 2: Kinematics and Dynamics

### Unit 3: Work and Energy

### Unit 4: Statics

### Unit 5: Fluids

### Unit 6: Thermodynamics

### Unit 7: Waves

### Unit 8: Geometric optics

### Unit 9: Optical systems

### Unit 10: Radiations

## ADDITIONAL COMMENTS, REMARKS

Information on readjustments in the progress of the course, practices and teaching material: all accessible through the Moodle platform

## 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	B01 B02 B03 B04 B05 EF01 EF04 EQ06 G01 G02 G03 G04 G05 G06 G07 G08 G09 G10 G11 G12 G13 G14 G15 T01 T02 T03 T04 T05 T06 T07 T08	0.84	21	Y	N	Theoretical classes of the subject in which the agenda is developed. At the end of some classes, questionnaires will be proposed on the concepts explained. In case plagiarism is detected in any of the questionnaires, the grade will be 0 points in that activity, both for the person/group that has copied and for the one that has allowed it (art. 8 REE).
Laboratory practice or sessions [ON-SITE]	Practical or hands-on activities	B01 B02 B03 B04 B05 EF01 EF04 EQ06 G01 G02 G03 G04 G05 G06 G07 G08 G09 G10 G11 G12 G13 G14 G15 T01 T02 T03 T04 T05 T06 T07 T08	0.8	20	Y	Y	Each student will present a report of each practice session, and at the end of the course a report on one of the practices carried out, work that will be assigned to each one by the teacher after the laboratory sessions are finished. If plagiarism is detected in any of the deliveries, the grade will be 0 points in that activity, both for the person/group that has copied and for the one that has allowed it (art. 8 REE).
Problem solving and/or case studies [ON-SITE]	Workshops and Seminars	B01 B02 B03 B04 B05 EF01 EF04 EQ06 G01 G02 G03 G04 G05 G06 G07 G08 G09 G10 G11 G12 G13 G14 G15 T01 T02 T03 T04 T05 T06 T07 T08	0.5	12.5	Y	N	During the classes there will be demonstrations and exercises of those points that require it. At the end of some classes, questionnaires will be proposed on the concepts explained. If plagiarism is detected in any of the deliveries, the grade will be 0 points in that activity, both for the person/group that has copied and for the one that has allowed it (art. 8 REE).
Group tutoring sessions [ON-SITE]	Group tutoring sessions	B01 B02 B03 B04 B05 EF01 EF04 EQ06 G01 G02 G03 G04 G05 G06 G07 G08 G09 G10 G11 G12 G13 G14 G15 T01 T02 T03 T04 T05 T06 T07 T08	0.1	2.5	N	-	Resolution of doubts and review of tests

Study and Exam Preparation [OFF-SITE]	Self-study	B01 B02 B03 B04 B05 EF01 EF04 EQ06 G01 G02 G03 G04 G05 G06 G07 G08 G09 G10 G11 G12 G13 G14 G15 T01 T02 T03 T04 T05 T06 T07 T08	3.6	90	N	-	Autonomous student work to prepare the subject
Formative Assessment [ON-SITE]	Assessment tests	B01 B02 B03 B04 B05 G01 G02 G03 G04 G05 G06 G07 G08 G09 G10 G11 G12 G13 G14 G15 T01 T02 T03 T04 T05 T06 T07 T08	0.16	4	Y	Y	Two partial written evaluation tests are established throughout the semester, or a final one. This activity will be recovered with a new test in successive calls. Fraudulent completion of the tests will result in a score of 0 points (art. 8 REE).
Total:			6	150			
Total credits of in-class work: 2.4			Total class time hours: 60				
Total credits of out of class work: 3.6			Total hours of out of class work: 90				

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
Test	70.00%	70.00%	In the continuous evaluation, two partial tests will be carried out, while in the non-continuous evaluation, a single final test will be carried out. These tests, whatever their modality, will consist of theory and problems, and may also contain experimental problems related to laboratory practices.
Practicum and practical activities reports assessment	20.00%	20.00%	Each student will present a report of each practice session, and at the end of the course a report on one of the practices carried out, work that will be assigned to each one by the teacher after the laboratory sessions are finished.  In the ordinary and extraordinary call, an evaluation test of laboratory skills will be made for those students who have not passed the practices. The practice exam will consist of a written test on assumptions of the laboratory practices.
Assessment of active participation	10.00%	10.00%	At the end of some classes, questionnaires will be proposed on the concepts explained.  If a student abandons the continuous assessment, this part will be recovered by a written test the day of the final exam.
<b>Total:</b>	<b>100.00%</b>	<b>100.00%</b>	

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:

It will be considered that all students opt for the continuous mode, unless otherwise informed (non-continuous mode) by email addressed to the course coordinator. The change of mode (from continuous to non-continuous) may be carried out as long as the 50% of the evaluable activities or the class period has not finished. In these cases, even if the student expresses the intention exchange, it cannot be processed.

To pass this subject, the student must:

\* Attend the practical laboratory sessions and carry out the deliveries and practical work assigned to them in a timely manner during the ordinary period. All students, regardless of whether they appear for the ordinary or extraordinary call (or completion, as the case may be) must meet these requirements. Each student will be assigned a practical report that must be positively evaluated (minimum mark of 4 out of 10) as an essential requirement to pass the subject.

\* Pass the two partial tests (minimum mark of 4 out of 10 in each of them). In case of not passing any of these two tests, the student will have to take the final exam of the entire subject.

If a student abandons the continuous evaluation, the final exam will have 70% of the weight in the grade, both in the ordinary and in the extraordinary call.

\* Students who achieve a grade of at least 5 points, after adding the percentages of all the evaluation activities, will be evaluated positively in the subject.

\* Attendance at theory classes and seminars is not mandatory, but participation with use in class will be valued by completing questionnaires.

##### Non-continuous evaluation:

\* If the laboratory practices have been passed (minimum mark of 4 out of 10), the final exam will have 70% of the weight in the grade.

\* An additional testing will assess the participation in class with a weight of 10%, both in the ordinary and in the extraordinary calls.

\* An assessment test of laboratory skills will be done for those students who have not passed the practices. The practice exam will consist of a written test on assumptions of the laboratory practices, accounting for 20% of the total grade.

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

The same valuation percentages apply as in the ordinary non-continuous mode, that is:

\* If the laboratory practices have been passed (minimum mark of 4 out of 10), the final exam will have a weight of 70% of the mark. The grade for this part may be maintained if it has been passed (minimum grade of 4 out of 10) in the ordinary call.

\* The additional test to evaluate the competencies of participation with achievement in class will have a weight of 10%. The grade for this part obtained in the ordinary call may be maintained (no minimum grade is required).

\* An assessment test of laboratory skills will be made for those students who have not passed the practices (minimum grade of 4 out of 10) in ordinary call. The practice exam will consist of a written test on assumptions of laboratory practices, and will account for 20% of the total grade.

Those students who have positively evaluated (minimum mark of 4 out of 10) the practices in an academic year but have not passed the subject, in successive courses may choose between repeating the complete practices or requesting that the grade obtained when they were carried out be maintained.

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

Only students who meet the requirements set out in the Student Evaluation Regulations of the University of Castilla-La Mancha will be able to access this call, and will be evaluated in accordance with the criteria applied in the extraordinary call.

## 9. Assignments, course calendar and important dates

### Not related to the syllabus/contents

Hours	hours
Class Attendance (theory) [PRESENCIAL][Lectures]	21
Laboratory practice or sessions [PRESENCIAL][Practical or hands-on activities]	20
Problem solving and/or case studies [PRESENCIAL][Workshops and Seminars]	12.5
Group tutoring sessions [PRESENCIAL][Group tutoring sessions]	2.5
Study and Exam Preparation [AUTÓNOMA][Self-study]	90
Formative Assessment [PRESENCIAL][Assessment tests]	4
<b>General comments about the planning:</b> Students can find updated information, teaching material, links of interest and details on aspects to facilitate the follow-up of the subject through the Moodle platform. The delivery dates of the evaluable activities will be announced at the beginning of the course also on the Virtual Campus.	
Global activity	
Activities	hours
Class Attendance (theory) [PRESENCIAL][Lectures]	21
Laboratory practice or sessions [PRESENCIAL][Practical or hands-on activities]	20
Problem solving and/or case studies [PRESENCIAL][Workshops and Seminars]	12.5
Group tutoring sessions [PRESENCIAL][Group tutoring sessions]	2.5
Study and Exam Preparation [AUTÓNOMA][Self-study]	90
Formative Assessment [PRESENCIAL][Assessment tests]	4
<b>Total horas: 150</b>	

## 10. Bibliography and Sources

Author(s)	Title/Link	Publishing house	Citv	ISBN	Year	Description
Tipler & Mosca	Física para la ciencia y la tecnología	Reverté		978-84-291-4426-0	2018	
Bauer & Westfall	Física para ciencias e ingeniería	McGraw-Hill		978-607-15-0545-3	2014	
Kane & Sternheim	Física	Reverte		84-291-4318-1	2000	
	<a href="http://books.google.es/books?id=Ij5kLw2uxGIC&amp;printsec=frontcover&amp;dq=kane+sternheim&amp;source=bl&amp;ots=ZUAOaUladr&amp;sig=BBzoJlu5jluukoiXkNEbsRLXtZl&amp;hl=es&amp;ei=gsDbS8L1CIWM0gTM26W-Bw&amp;sa=X&amp;oi=book_result&amp;ct=result&amp;resnum=1&amp;ved=0CAYQ6AEwAA#v=onepage&amp;q&amp;f=false">http://books.google.es/books?id=Ij5kLw2uxGIC&amp;printsec=frontcover&amp;dq=kane+sternheim&amp;source=bl&amp;ots=ZUAOaUladr&amp;sig=BBzoJlu5jluukoiXkNEbsRLXtZl&amp;hl=es&amp;ei=gsDbS8L1CIWM0gTM26W-Bw&amp;sa=X&amp;oi=book_result&amp;ct=result&amp;resnum=1&amp;ved=0CAYQ6AEwAA#v=onepage&amp;q&amp;f=false</a>					
Eric Weisstein	Science World	Wolfram Research				
	<a href="http://scienceworld.wolfram.com/physics/">http://scienceworld.wolfram.com/physics/</a>					
Young y Freedman	Física Universitaria	Pearson		978-607-32-2124-5	2013	
Serway y Jewett	Física para ciencias e ingeniería	Cengage Learning		978-607-519-198-0	2015	