UNIVERSIDAD DE CASTILLA - LA MANCHA

GUÍA DOCENTE

1. General information

Course: FUNDAMENTALS OF PHYSICS I
Code: 59602
Type: BASIC
ECTS credits: 6
Degree: 385 - DEGREE IN TELECOMMUNICATI TECHNOLOGY ENGINEERING
Academic year: 2022-23
Center: 308 - SCHOOL POLYTECHNIC OF CUENCA
Group(s): 30
Year: 1
Duration: First quarter
Main language: Spanish
Second language:
Use of additional languages:
English Friendly: Y
Web site:
Bilingual: N

Lecturer: **JOAN MIQUEL GALVE ROMERO** - Group(s): **30**

Building/Office	Department	Phone number	Email	Office hours
Escuela Politécnica de Cuenca/IDR	FÍSICA APLICADA	967599200;ext=2229	joanmiquel.galve@uclm.es	

2. Pre-Requisites

Since this is a subject that begins in the first semester, it is not necessary to have specific knowledge of any other subject, although it is necessary the basic knowledge of secondary education, especially in physics and mathem

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

The subject of physics of the Degree in Telecommunications Technology Engineering is divided into two subjects belonging to the block of basic subjects of the degree. Fundamentals of Physics I describes the physical laws and

4. Degree competences achieved in this course

Course competences

Code	Description
E03	Understanding and mastering the basic concepts of the general laws of mechanics, thermodynamics, fields and waves and electromagnetism and their application for solving engineering related problems.
G02	Correct, oral and written, communication skills.
G06	Knowledge of basic subjects and technologies, enabling students to learn new methods and technologies, as well as providing great versatility to adapt to new situations
G13	The ability to look for and understand information, wether technical or commercial in different sources, to relate and structure it to integrate ideas and knowledge. Analysis, synthesis and implementation of ideas and knowledge.

5. Objectives or Learning Outcomes

Course learning outcomes

Description
Correct use of oral and written expression to convey ideas, technologies, results, etc.
Use of computer tools for numerical resolution of geometric and numerical problems.
Use of acoustic guided waves in acoustic tubes.
Correct handling of the mechanical magnitudes in three dimensions.
Modeling of general mechanical problems through mechanical oscillators.
Understanding of the thermodynamic magnitudes on which the acoustic waves are based.
Understanding of the behavior of acoustic waves in three dimensions, both in free propagation and in enclosures.
Understanding of the mechanical oscillator system behavior, with and without resistance, as well as their behavior with external disturbances of harmonic type.
Use of the adequate approximation of a wave phenomenon, distinguishing between the geometric approximation and the wave one.
Use of formal relationships that link physical magnitudes such as force or energy, with kinematic magnitudes in the resolution of mechanical problems.

6. Units / Contents

Unit 1: Physical magnitudes
- **Unit 1.1** Dimensional analysis
- **Unit 1.2** Errors treatment
- **Unit 1.3** Review operations with vectors
- **Unit 1.4** PRACTICE 1. The measurement and its treatment

Unit 2: Kinematics
- **Unit 2.1** Rectilinear motion
- **Unit 2.2** Circular motion
- **Unit 2.3** Simple harmonic motion
- **Unit 2.4** Motion composition
- **Unit 2.5** PRACTICAL EXERCISE. Study of 2D motion using Excel
- **Unit 2.6** PRACTICAL EXERCISE. Calculation of speeds and numerical accelerations using Excel

Unit 3: Dynamics
- **Unit 3.1** Forces. Newton¿s Laws
- **Unit 3.2** Work and energy
- **Unit 3.3** Power

Unit 4: Mechanical oscillators
- **Unit 4.1** Damped oscillators
- **Unit 4.2** Forced oscillators
- **Unit 4.3** Electrical analogy. RCL circuit
- **Unit 4.4** PRACTICE 2. Study of the elastic constant of a spring

Unit 5: One-dimensional waves. The vibrating rope
- **Unit 5.1** Mechanical waves on a forced rope at one end
- **Unit 5.2** Reflection and transmission of waves on a vibrating string
- **Unit 5.3** Own modes on a finite length string
- **Unit 5.4** PRACTICE 3. Stationary waves on a string

Unit 6: Two-dimensional waves. Vibrating membranes
- **Unit 6.1** Two-dimensinal. Helmholtz Equation
- **Unit 6.2** Own modes in 2D
- **Unit 6.3** PRACTICAL EXERCISE. Own modes in a rectangular membrane with Matlab

Unit 7: Fundamentals of thermology
- **Unit 7.1** Thermal expansion
- **Unit 7.2** Ideal gases
- **Unit 7.3** Laws of thermodynamics
- **Unit 7.4** Heat transfer

Unit 8: Three-dimensional waves. Acoustic waves
- **Unit 8.1** Acoustic wave equation in 3D. Flat waves and spherical waves
- **Unit 8.2** Intensity and intensity level
- **Unit 8.3** Own modes in rooms
- **Unit 8.4** Acoustic waveguides

ADDITIONAL COMMENTS, REMARKS

The didactic material used in the development of the subject, and which is available in the virtual platform of the course, is:

- Software: Excel and Matlab

- Notes: transparencies of the subject.

- Collection of exercises

- Practices manual

7. Activities, Units/Modules and Methodology

Training Activity	Methodology	Related Competences	ECTS	Hours	As	Com	Description

Class Attendance (theory) [ON-SITE]	Lectures	E03 G02 G06	1	25	N	-	Theoretical classes of the subject in which the syllabus is developed
Class Attendance (practical) [ON-SITE]	Problem solving and exercises	E03 G02	1	25	N	-	During the classes there will be demonstrations and exercises of those required points
Computer room practice [ON-SITE]	Practical or hands-on activities	E03 G02 G06 G13	0.12	3	Y	Y	During the practical sessions, the realization of the practicals and the results obtained will be evaluated in-situ. In the case of not being able to attend the sessions for justified reasons, in the ordinary exam there will be a test that allows to pass this part.
Laboratory practice or sessions [ON-SITE]	Practical or hands-on activities	E03 G02 G06 G13	0.12	3	Y	Y	During the laboratory sessions, the performance of the practices and the results obtained will be evaluated in-situ. In the case of not being able to attend the sessions for justified reasons, in the ordinary call there will be a test that allows to pass this part.
Writing of reports or projects [OFF-SITE]	Self-study	E03 G02 G06 G13	1.6	40	Y	Y	In general, for each of the practices a report will be delivered describing the work carried out, and showing the results and analysis, as well as the main conclusions. If plagiarism is detected in any of the deliveries, the grade will be 0 points in that activity, both for the person / group who has plagiarized and for the one who has allowed it (art. 9 REE).
Study and Exam Preparation [OFF-SITE]	Self-study	E03 G02 G06 G13	2	50	N	-	Autonomous work of the student to prepare the subject
Individual tutoring sessions [ON-SITE]	Guided or supervised work	E03 G02 G06 G13	0.04	1	N	-	Resolution of doubts and review of grades
Mid-term test [ON-SITE]	Assessment tests	E03 G02 G06 G13	0.04	1	Y	N	1 or 2 written evaluation tests will be established throughout the semester. This activity will be recovered with a new test in ordinary or extraordinary exams. The fraudulent realization of the tests will suppose a grade of 0 points (art. 9 REE).
Final test [ON-SITE]	Assessment tests	E03 G02 G06 G13	0.08	2	Y	Y	Corresponds to the test to be carried out on the date of the ordinary exam. This activity will be recovered with a new test on the date of the extraordinary exam. The fraudulent realization of the tests will suppose a grade of 0 points (art. 9 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
Laboratory sessions	20.00%	20.00%	The exercises and delivery questionnaires solved in the classroom and at home, together with the laboratory practices and their public exposure will mean a numerical grade from 0 to 10. This qualification will mean 20% of the total grade of the subject. Students who can not attend laboratory practices should contact the responsible teacher at the beginning of the semester.
Test	80.00%	80.00%	Proof of progress will be weighted to obtain a numerical score between 0 and 10. This test can be divided into partial tests made throughout the course. where theoretical / practical knowledge will be evaluated. At least 10% of the progress tests must include the individualized grade of the work done in group by the students. This qualification will represent 80% of the total grade of the subject
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:

It is necessary to obtain a grade greater than or equal to 4 points in each of the written tests to be able to average with the rest of the evaluation activities. The average of all the evaluation activities must be equal to or greater than 5 points to pass the subject.

The final exam will be a global test that allows to overcome separately both the practices and the theoretical / practical contents developed throughout the course for those students who have not passed any of the partial evaluation tests.

Non-continuous evaluation:

The final exam will be a global test that allows to overcome separately both the practices and the theoretical / practical contents developed throughout the course for those students who have not passed any of the partial evaluation tests.

Specifications for the resit/retake exam:

The final exam will be a global test of the whole subject

Specifications for the second resit / retake exam:

The final exam will be a global test of the whole subject

9. Assignments, course calendar and important dates

Not related to the syllabus/contents

Hours	hours
Computer room practice [PRESENCIAL][Practical or hands-on activities]	3
Laboratory practice or sessions [PRESENCIAL][Practical or hands-on activities]	3
Writing of reports or projects [AUTÓNOMA][Self-study]	40
Study and Exam Preparation [AUTÓNOMA][Self-study]	50
Individual tutoring sessions [PRESENCIAL][Guided or supervised work]	1
Mid-term test [PRESENCIAL][Assessment tests]	1
Final test [PRESENCIAL][Assessment tests]	2

General comments about the planning: The units will be taught consecutively adapting to the actual calendar that is held in the semester in which the subject is located. Works will be asked with a periodicity of two weeks, corresponding to the taught agenda. It is also planned to conduct a progress test, not mandatory, mid-term equivalent to 40% of the final grade of the subject. Also depending on the progress of the subject, the planning will be adapted.

Unit 1 (de 8): Physical magnitudes

Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	1
Class Attendance (practical) [PRESENCIAL][Problem solving and exercises]	1

Unit 2 (de 8): Kinematics

Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	3
Class Attendance (practical) [PRESENCIAL][Problem solving and exercises]	3

Unit 3 (de 8): Dynamics

Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	3
Class Attendance (practical) [PRESENCIAL][Problem solving and exercises]	4

Unit 4 (de 8): Mechanical oscillators

Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	3
Class Attendance (practical) [PRESENCIAL][Problem solving and exercises]	3

Unit 5 (de 8): One-dimensional waves. The vibrating rope

Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	6
Class Attendance (practical) [PRESENCIAL][Problem solving and exercises]	6

Unit 6 (de 8): Two-dimensional waves. Vibrating membranes

Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	2
Class Attendance (practical) [PRESENCIAL][Problem solving and exercises]	2

Unit 7 (de 8): Fundamentals of thermology

Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	3
Class Attendance (practical) [PRESENCIAL][Problem solving and exercises]	3

Unit 8 (de 8): Three-dimensional waves. Acoustic waves

Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	4
Class Attendance (practical) [PRESENCIAL][Problem solving and exercises]	3

Global activity

Activities	hours
Class Attendance (theory) [PRESENCIAL][Lectures]	25
Class Attendance (practical) [PRESENCIAL][Problem solving and exercises]	25
Computer room practice [PRESENCIAL][Practical or hands-on activities]	3
Laboratory practice or sessions [PRESENCIAL][Practical or hands-on activities]	3
Writing of reports or projects [AUTÓNOMA][Self-study]	40

Study and Exam Preparation [AUTÓNOMA][Self-study]	50
Individual tutoring sessions [PRESENCIAL][Guided or supervised work]	1
Final test [PRESENCIAL][Assessment tests]	2
Mid-term test [PRESENCIAL][Assessment tests]	1
Total horas:	150

10. Bibliography and Sources

Author(s)	Title/Link	Publishing house	Citv	ISBN	Year	Description
Kinsler	Fundamentos de acústica	Limusa / Noriega Editores		968-18-2026-6	1995	
Linares, Llopis, Sancho	Acústica arquitectónica	Servicio de publicaciones de la UPV				
Serway, Raymond A.	Física para ciencias e ingeniería	McGraw-Hill		970-10-3582-8 (tomo	2002	
Tipler, Paul Allen	Física para la ciencia y la tecnología	Reverté		978-84-291-4428-4	2014	
Young y Freedman	Física universitaria	Pearson		978-607-32-2124-5	2013	
Alonso M. y Finn E.J.	Física	Adison Wesley				
González, Félix A. (González Hernández)	La física en problemas	Tébar Flores		84-95447-07-X	2000	
Arribas Garde, Enrique	Introducción a la física : (magnitudes, errores, vectores y	Moralea		84-95887-02-9	2001	