

**1. General information****Course:** FUNDAMENTALS OF PHYSICS**Type:** BASIC**Degree:** 345 - UNDERGRADUATE DEGREE PROGRAMME IN CIVIL ENGINEERING**Center:** 603 - E.T.S. CIVIL ENGINEERS OF CR**Year:** 1**Main language:** Spanish**Use of additional languages:****Web site:****Code:** 38304**ECTS credits:** 6**Academic year:** 2023-24**Group(s):** 20**Duration:** First semester**Second language:****English Friendly:** N**Bilingual:** N**Lecturer:** SANTIAGO EXPOSITO PAJE - Group(s): 20

Building/Office	Department	Phone number	Email	Office hours
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2. Pre-Requisites

The basic knowledge of mathematics and physics that the students are expected to get during secondary education (Bachillerato).

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

The student will acquire during this course the knowledge of basic physical phenomena related to Civil Engineering in the area of Applied Physics (Waves, Thermodynamics and Electromagnetism). At the end of the course, the student will be able to:

- Understand the mathematical models involved in fundamental of physics.
- Understand and use the scientific method and scientific language.
- Develop reasoning strategies and techniques for analysing and solving problems related to Civil Engineering.
- Analyse and interpret experimental data.
- Deal with laboratory instruments.

4. Degree competences achieved in this course**Course competences**

Code	Description
CE07	Students reach understanding and mastery of the basic concepts on the general laws of mechanics, thermodynamics, fields and waves and electromagnetism and their application for the solution of engineering problems.
CG01	Students achieve general knowledge of Information and Communication Technologies (ICT).
CG02	Students can use proper oral and written communication

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

Development of skills, abilities and techniques necessary for the formulation, development and resolution of problems.

Understanding and mastering the basic concepts of the general laws of thermodynamics, fields and waves and electromagnetism, and their application to solving engineering problems.

Learning of the experimental techniques necessary for the measurement and subsequent analysis of physical quantities related to thermodynamics, fields and waves and electromagnetism.

Qualification in the use of computer-based data analysis and processing and simulation programs.

Understanding the mathematical models that explain those fundamentals.

6. Units / Contents**Unit 1: WAVES****Unit 1.1** Fundamentals of wave motion**Unit 1.2** Sound waves**Unit 1.3** Standing waves**Unit 1.4** Wave phenomena**Unit 2: THERMODYNAMICS****Unit 2.1** Temperature and thermal processes**Unit 2.2** Heat and first law of thermodynamic**Unit 2.3** Second law of thermodynamic

Unit 3: ELECTROSTATIC AND MAGNETOSTATIC**Unit 3.1** Electric field and potential**Unit 3.2** Electric current**Unit 3.3** Magnetic current**Unit 3.4** Magnetic induction**Unit 4: 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	CE07 CG01 CG02	0.96	24	Y	N	Not recoverable.
Problem solving and/or case studies [ON-SITE]	Problem solving and exercises	CE07 CG01 CG02	0.68	17	Y	N	Recoverable. Retake exam.
Laboratory practice or sessions [ON-SITE]	Practical or hands-on activities	CE07 CG01 CG02	0.48	12	Y	N	Recoverable. Retake exam.
Mid-term test [ON-SITE]	Assessment tests	CE07 CG02	0.2	5	Y	N	Recoverable. Retake exam.
Project or Topic Presentations [ON-SITE]	Workshops and Seminars	CG01 CG02	0.08	2	Y	N	Not recoverable.
Study and Exam Preparation [OFF-SITE]	Self-study	CE07 CG01 CG02	2.6	65	Y	N	Recoverable. Retake exam.
Practicum and practical activities report writing or preparation [OFF-SITE]	Self-study	CE07 CG01 CG02	0.92	23	Y	N	Recoverable. Retake exam.
Writing of reports or projects [OFF-SITE]	Self-study	CE07 CG01 CG02	0.08	2	Y	N	Recoverable. Retake exam.
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	10.00%	0.00%	The pupils must carry out experimental measurements and analyse the results in Laboratory sessions.
Practicum and practical activities reports assessment	10.00%	0.00%	Presentation of Laboratory reports.
Assessment of active participation	15.00%	0.00%	The work performed and pupils attitude are evaluated. A regular evaluative process is conducted in the presentation classes through exercises class and assignments.
Mid-term tests	65.00%	0.00%	Four partial exams will be taken (waves, thermodynamic, electromagnetism and laboratory). Not recoverable.
Final test	0.00%	100.00%	100% of the final exam (Around 20% Unit 4_ Laboratory).
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:**

Unless stated otherwise, continuous evaluation criteria will be applied to all students.

Anyone choosing non-continuous assessment must notify it to the lecturer within the class period of the subject.

The option is only available if the student's participation in evaluation activities (from the continuous assessment) has not reached 50% of the total evaluation for the subject.

The final mark is obtained with the percentages indicated.

Laboratory sessions (20% of final mark) Evaluation based on:

- Attendance to the laboratory sessions, participation and attitude. Activities in groups of students.
- Laboratory reports quality (with computer tools).
- Laboratory exam

Work (15% of final mark). Evaluation based on:

- Attendance.
- Short test exams.
- Delivery and quality of proposed activities

Three written exam (65% of final mark)

These exams consist in:

- Problem solving covering the topics of the program and

- Short theoretical questions (test questions)
- Not recoverable.

No test marks will be kept for the extraordinary call.

The details of the requirements of the works or laboratory practices that have to be delivered will be indicated in Campus Virtual with sufficient advance.

Non-continuous evaluation:

100% of the final exam (Around 20% Unit 4_ Laboratory).

Specifications for the resit/retake exam:

100% of the final exam (Around 20% Unit 4_ Laboratory).

Specifications for the second resit / retake exam:

100% of the final exam (Around 20% Unit 4_ Laboratory).

9. Assignments, course calendar and important dates	
Not related to the syllabus/contents	
Hours	hours
Mid-term test [PRESENCIAL][Assessment tests]	5
Project or Topic Presentations [PRESENCIAL][Workshops and Seminars]	2
Study and Exam Preparation [AUTÓNOMA][Self-study]	65
Writing of reports or projects [AUTÓNOMA][Self-study]	2
Unit 1 (de 4): WAVES	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	8
Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises]	4
Unit 2 (de 4): THERMODYNAMICS	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	5
Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises]	3
Unit 3 (de 4): ELECTROSTATIC AND MAGNETOSTATIC	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	11
Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises]	10
Unit 4 (de 4): LABORATORY	
Activities	Hours
Laboratory practice or sessions [PRESENCIAL][Practical or hands-on activities]	12
Practicum and practical activities report writing or preparation [AUTÓNOMA][Self-study]	23
Global activity	
Activities	hours
Laboratory practice or sessions [PRESENCIAL][Practical or hands-on activities]	12
Practicum and practical activities report writing or preparation [AUTÓNOMA][Self-study]	23
Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises]	17
Mid-term test [PRESENCIAL][Assessment tests]	5
Project or Topic Presentations [PRESENCIAL][Workshops and Seminars]	2
Study and Exam Preparation [AUTÓNOMA][Self-study]	65
Writing of reports or projects [AUTÓNOMA][Self-study]	2
Class Attendance (theory) [PRESENCIAL][Lectures]	24
Total horas: 150	

10. Bibliography and Sources						
Author(s)	Title/Link	Publishing house	Citv	ISBN	Year	Description
Alonso, Marcelo	Physics	Pearson-Prentice Hall		0-201-56518-8	1992	
Halliday, David (1916-2010)	Fundamentals of physics /	John Wiley & Sons,		0-471-09675-X	1997	
Santiago Expósito Paje	600 cuestiones tipo test: fundamentos de física para la ingeniería civil			978-84-615-6423-1	2012	Ejercicios tipo test de respuestas multiples
Santiago Expósito Paje	Física para la Ingeniería: Problemas y Soluciones			978-84-87087-75-2	2011	Vol. 2 Electricidad y Magnetismo
Santiago Expósito Paje	Física para la Ingeniería: Problemas y Soluciones			978-84-87087-74-5	2011	Vol. 1 Ondas y Termodinámica
Serway, Raymond A.	Physics for scientists and engineers	Saunders College Publishing		0-03-026961-X	2000	
Tipler, Paul Allen	Physics for scientist and engineers / Paul A. Tipler	W.H. Freeman		1-57259-673-2	1999	
Young, Hugh D.	University physics : with modern physics tecnologia update /	Pearson Education,		978-1-292-10031-9	2016	