



PERSONA CIÈNCIA EMPRESA
UNIVERSITAT RAMON LLULL

COURSE: PHYSICS

SUBJECT MATTER: Physics

MODULE: Basic Formation

PROGRAM: Degree in Chemical Engineering

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GENERAL FEATURES*

Sort: Basic Formation, Mandatory, Elective

Final Degree Project, Practicum

Duration: annual

Semester/s: 1st & 2nd

Number of ECTS credits: 12

Language/s: Spanish & Catalan

DESCRIPTION

SHORT DESCRIPTION AND JUSTIFICATION

Physics is an essential part of any engineering career, along with Mathematics form the basis upon which any scientific knowledge is developed.

The subject aims to familiarize the student with the main physical theories, with the approach and resolution of problems and finally with the necessary techniques for the resolution of the proposed models, including the realization of reasonable simplifications.

The subject includes as essential contents the following: description of physical units and magnitudes, development of the concepts of mechanics applicable to solids, liquids and gases, description of the fundamentals of electromagnetism and finally description of the main concepts related to wave motion.

COMPETENCES

- To be able to understand and apply the basic knowledge of physics that, based on the knowledge acquired in general secondary education, are necessary for the practice of Chemical Engineering. (→E1, CB1)
- To be able to identify, formulate and solve problems in the field of chemistry and engineering. (→E7, CB2)
- To be able to understand and master the basic concepts about the general laws of mechanics, thermodynamics, fields and waves and electromagnetism and its application for the resolution of engineering problems. (→FB2)

PRIOR REQUIREMENTS

According to the program planning and academic regulations.

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CONTENTS

- 0. Magnitudes, units and mathematical methods.
- I. Mechanics.
 - 1. Kinematics
 - 2. Dynamics
 - 3. Work and energy.
 - 4. Mechanics of solids and fluids.
 - 5. Particle systems. Conservation theorems. Shocks.
 - 6. Rigid body. Dynamics of rotation.
- II. Electromagnetism.
 - 7. Electrostatics.
 - 8. DC circuits.
 - 9. Magnetism.
- III. Oscillations. Fundamentals of optics.
 - 10. Simple harmonic motion.
 - 11. Wave motion.
 - 12. Wave interference.
 - 13. Geometric optics.

METHODOLOGY

LEARNING ACTIVITIES

Learning activities	Hours	ECTS credits	Competences
Lectures	70	2,6	E1, CB1, FB2
Problem-solving sessions	51	1,9	E1, CB1, E7, CB2, FB2
Seminars	-	-	E1, CB1, E7, CB2, FB2
Practical & Lab work	-	-	
Presentations	-	-	
Study activities	189	7,0	E1, CB1, E7, CB2, FB2
Assessment Tasks (Exams, Continuous Assessment...)	14	0,5	E1, CB1, E7, CB2, FB2
TOTAL	324	12	

TEACHING METHODOLOGY

The subject is taught by theory classes, in which the basic concepts of each chapter are explained, and by practical classes of problems in which the students must strengthen the knowledge taught in the theoretical classes. Therefore, their active participation is fundamental.

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ASSESSMENT

ASSESSMENT METHODS*

Assessment methods	Weight	Competences
Final exams	40%	E1, CB1 E7, CB2
Midterm exams	60%	E1, CB1 E7, CB2
Continuous assessment activities	-	
Reports & presentations	-	
Experimental work	-	
Projects	-	
Internship	-	
Participation	-	

LEARNING OUTCOMES

- The student must demonstrate the theoretical knowledge of the main physical concepts. (→ E1, CB1)
- The student must demonstrate proficiency in understanding, approach and problem solving. (→ E1, CB1, E7, CB2)
- The student must demonstrate proficiency in the correct use of the tools of the calculation and bibliographic search applied to the resolution of physical problems related to chemistry, biosciences and chemical engineering. (→ E7, CB2, FB2)

QUALIFICATION

During the course there will be 4 controls, two in each semester (C11, C12, C21, C22), 2 partial exams (P1, P2) and a final exam in June and another in July (EF).

Each partial will have a mark that is calculated as:

$$NP_i = 0.25 * (C_{i1} + C_{i2}) / 2 + 0.75 * P_i, i = 1, 2$$

If the marks of the two partials (NP1, NP2) are higher than 4 out of 10 and their average is equal to or greater than 5 out of 10, then it is not necessary to take the final exam, and the final grade will be the average of the marks of the two partial ones ($NF = 0.5 * NP1 + 0.5 * NP2$). Otherwise, the final exam must be carried out.

The final exam will consist of two parts, corresponding to the subject of the two partials (EF1, EF2). The student can waive a part of the final exam if the corresponding grade of the partial NP_i is equal to or higher than 4 out of 10 (in this case, the grade of that part of the final exam will be the one corresponding to the partial: $EF_i = NP_i, i = 1 \text{ or } 2$).



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When the mark of a part of the final exam EFi is higher than that of the corresponding partial NP_i, it will replace it.

The final grade of the subject will be the average:

$$NF = 0.6 * (NP1 + NP2) / 2 + 0.4 * (EF1 + EF2) / 2$$

In the July session, a new final exam will be held, applying the same criteria as in the final exam in June.

ASSESSMENT OF THE COMPETENCES

The competences E1/CB1, E7/CB2 and FB2 will be assessed by the final mark of the course.

BIBLIOGRAPHY

- P. A. Tipler, G. Mosca, "Física, para la ciencia y la tecnología", Ed. Reverté.
- Raymond A. Serway y Robert J. Beichner "Física", Ed. McGraw Hill
- "Fórmulas y tablas de matemática aplicada", Serie Schaum. Ed McGraw Hill.

DOCUMENT HISTORY

PREVIOUS CHANGES

September 8th, 2017, Dr. Joaquín Menacho
September 8th, 2016, Dr. Joaquín Menacho
September 10th, 2015, Dr. Joaquín Menacho
September 5th, 2014, Dr. Alberto Balfagón
September 9th, 2013, Dr. Alberto Balfagón
September 13th, 2012, Dr. Alberto Balfagón
September 7th, 2011, Dr. Alberto Balfagón
September 6th, 2010, Dr. Alberto Balfagón
September 9th, 2009, Dr. Alberto Balfagón
November 25th, 2008, Dr. Alberto Balfagón

LAST REVISION

September 3rd, 2018, Dr. Joaquín Menacho