COURSE DATA

Data Subject	
Code	34652
Name	Physics
Cycle	Grade
ECTS Credits	6.0
Academic year	2019 - 2020

Study (s)

Degree	Center	Acad. year	Period
1400 - Degree in Computer Engineering	School of Engineering	1	Second term

Subject-matter

Degree	Subject-matter	Character
1400 - Degree in Computer Engineering	4 - Physics	Basic Training

Coordination

Name	Department
DIEZ CREMADES, ANTONIO	175 - Applied Physics and Electromagnetism
MARTINEZ PASTOR, JUAN PASCUAL	175 - Applied Physics and Electromagnetism

SUMMARY

Physics is a fundamental subject that is present in all degrees of Science and Engineering. Specifically Physics is coursed in the second semester of the first academic year. It consists of a part of theory and exercises and another of practical work in laboratory. The course establishes the basis of wave phenomena and Electromagnetism. It begins with the study of mechanical waves, with special attention to sound, and electromagnetic waves. Next the basic principles of electromagnetism are presented, studying the electrostatic and magnetostatic fields in vacuum and in material media, and the phenomenon of magnetic induction.
The contents of the course are: mechanical, acoustic waves and electromagnetic waves. Electricity, Magnetism and magnetic induction, which are divided into thematic units listed in Section 6.
The main objective of the course is to provide students with basic knowledge regarding with mechanical and electromagnetic waves, in addition to Electromagnetism, that will allow the student to understand and explain themselves the phenomena involved in Engineering based in those areas of knowledge. Moreover, the course intends to provide physical knowledge that can be required for other course of the

Degree.

PREVIOUS KNOWLEDGE

Relationship to other subjects of the same degree

There are no specified enrollment restrictions with other subjects of the curriculum.

Other requirements

Knowledge of physics, chemistry and mathematics at high school or similar.

OUTCOMES

1400 - Degree in Computer Engineering

- G8 - Knowledge of basic subject areas and technologies that serve as a basis for learning and developing new methods and technologies, and of those which provide versatility to adapt to new situations.
- G9 - Ability to solve problems with initiative, decision making, autonomy and creativity. Ability to communicate and transmit the knowledge, skills and abilities of a computer engineer.
- B2 - Understanding and mastery of basic concepts of fields and waves and electromagnetism, electrical circuit theory, electronic circuits, physical principles of semiconductors and logic families, electronic and photonic devices and their application for solving problems in engineering.

LEARNING OUTCOMES

Learning outcomes:
• Be able to evaluate clearly the orders of magnitude and relative importance of different causes involved in a physical phenomenon.
• Know and understand the fundamentals of physics and mathematical background for the formulation, and most important applications in industry or daily life.
• Solve problems, being able to identify the essential elements and perform the required approximations.
• Be able to delve into the different branches of physics from the basic concepts acquired in this area, integrating mathematical formalisms and more complex concepts.
• Be able to communicate information, ideas, problems and solutions through argumentation and reasoning.

Additional skills to be acquired:
The student should be able to:

• Understanding and mastery of basic concepts and electromagnetic wave and its application to solving problems of engineering.
• Knowledge of principles and technologies that enable them to learn new methods, and to adapt to new

situations. Acquire the necessary training in electromagnetism and waves to support other areas of engineering.
• Ability to solve problems, apply knowledge creatively and communicate knowledge in the field of engineering. • Identify and electromagnetic wave phenomena.
• Know the principles of operation of devices and systems based on electromagnetic or wave phenomena.
• Know how to evaluate the order of magnitude of the phenomena studied devices.
• Be able to apply their knowledge to different technological branches, specifically in the field of computer engineering.
• Know how to organize and communicate knowledge and information.

In addition to the specific objectives mentioned above, the course will encourage the development of several generic skills, among which include:
• Develop the ability to identify problems and devise strategies for their resolution.
• Develop the ability to plan and organize their own learning based on individual work, from the literature and other sources.
• Develop the ability to work in groups.
• Develop the ability to argue from rational and scientific criteria.
• Develop the ability to track their learning from the issues and problems done in class.
• Develop the capacity to develop a text based on suggested reading and written in an understandable and organized.
• Assess the relative importance of different causes involved in a phenomenon.
• Identify the essential elements of a complex situation, make the necessary approaches to construct simplified models that describe and to understand their behavior and in other situations.

DESCRIPTION OF CONTENTS

1. Wave motion.

Wave phenomena. Wave equation. Periodic harmonic waves. Wavelength, frequency and speed. Superposition of waves: standing waves. Energy and intensity of a wave. Absorption and attenuation.

2. Sound and Light

Acoustics. Intensity level and loudness. Electromagnetic waves: speed of light. Plane waves. Electromagnetic spectrum. Poynting vector. Intensity and radiation pressure. Doppler effect.

3. Electrostatic field in vacuum

Coulomb's law. Electric field. Gauss theorem. Potential. Work.

4. Electrostatic field in matter

Loaded conductors in electrostatic equilibrium balance. Capacitors with different geometry and capacity. Charging and energy storage. Polarization and dielectric permittivity materials.

5. Static magnetic field in vacuum

Magnetic field and Lorentz Force. Electric current. Action of a magnetic field on a current. Biot-Savart Law. Ampère's theorem.

6. Magnetostatic fiels in matter

Media magnetic materials. Relative magnetic permeability. Magnetic properties of matter.

7. Electromagnetic induction

Faraday's law of induction. Inductive devices. Displacement current.

8. Laboratory sessions

Propagation of electromagnetic waves.
Wave interferences.
Measurement of magnetic fields.
Electromagnetic induction and electrical transformers

WORKLOAD

ACTIVITY	Hours	% To be attended
Classroom practices	25,00	100
Theory classes	25,00	100
Laboratory practices	10,00	100
Development of individual work	4,00	0
Study and independent work	15,00	0
Readings supplementary material	2,00	0
Preparation of evaluation activities	8,00	0
Preparing lectures	9,00	0
Preparation of practical classes and problem	17,00	0
Resolution of case studies	33,00	0
Resolution of online questionnaires	2,00	0
TOTAL	**150,00**	

TEACHING METHODOLOGY

• **Class work**: Theory classes, problem classes and laboratory classes.
• **Home work**: preparation of classes, problem solving, job preparation and presentation of results.
• Individual and group **tutorials**.

EVALUATION

To evaluate the student's learning, the following criteria will be applied:

(a) The theoretical and practical concepts will be evaluated through conducted written tests. The evaluation of the theoretical-practical contents will suppose **80%** of the total qualification. Partial tests will be conducted throughout the course, which will allow the student eliminating subjects for the final exam, as long as the mark obtained in the test is at least of 4 points out of 10. The particular weight of each partial test will be indicated by the teacher. In addition, the teacher can propose, based on the characteristics of the group, other complementary forms of continuous evaluation of the work done by the student throughout the course (problem solving, development of topics, laboratory work, presentation of results, etc ...). The students cannot be penalized for not performing the partial tests or the complementary activities. In this case, the evaluation will be carried out by performing a final exam. The exams and partial tests will involve solving and answering questions of theory and problems.

(b) The evaluation of the experimental contents in the laboratory will suppose **20%** of the total qualification. Attendance at laboratory classes is mandatory. The obtained mark will be valid during the current academic course in which the practices are carried out, and in the immediately subsequent course, provided that the qualification obtained is equal to or greater than 5out of 10.

The final mark will be obtained as the sum of the grades of the sections (a) and (b), as long as the mark in each contribution is equal to or higher than 4 points out of 10. The subject will have been passed when a final score is obtained. equal to or greater than 5 points out of 10 points.

In any case, the evaluation of the subject will be done in accordance with the Regulation of evaluation and qualification of the Universitat de València for the degree and master's degrees approved by the Government Council of May 30, 2017 (ACGUV 108/2017)

REFERENCES

Basic

- Referencia b1: Física, P.A. Tipler, G. Mosca, Edt. Reverte.

Additional

- Referencia c1: Física para ciencias e ingeniería, P.M. Fishbane, S. Gasiorowicz, S. T. Thornton, Vol 1 y 2, Prentice Hall, 1993.
- Referencia c2: Physics for scientists and engineers, R.A. Serway, Edt Sunders Golden Burst Series.

ADDENDUM COVID-19

This addendum will only be activated if the health situation requires so and with the prior agreement of the Governing Council

1. Contenidos

Los contenidos inicialmente programados para los temas 1, 2, 3 , 4 y 5 se mantienen. En el caso de los temas 6, 7 y 8 se reducen los contenidos para seguir los criterios del formato de docencia On-Line. Si bien se tratarán todos los puntos previstos inicialmente del temario, se reducirá la extensión y profundidad en que se tratan con el objetivo de garantizar el seguimiento de las clases no presenciales.

2. Volumen de trabajo y planificación temporal de la docencia

La estrategia seguida por el equipo docente ha sido la de procurar mantener la dinámica de aprendizaje sin que eso suponga una carga extra al alumnado ni una interferencia con los horarios previamente establecidos y su dedicación temporal, teniendo en cuenta las nuevas características asociadas a la docencia on-line.

Las horas de trabajo inicialmente previstas para prácticas en aula y clases de teoría se mantienen inalteradas, mediante el uso de clases por videconferencia en el horario inicialmente estipulado. El volumen de trabajo para el periodo de docencia de estas partes no sufre modificación.

Las prácticas en laboratorio, que eran 100% presenciales, se sustituyen por las mismas horas de estudio y trabajo dirigido, a realizar de forma no presencial, en base al material propio del profesorado facilitado vía Aula Virtual.

3. Metodología docente

- La metodología de los temas 1, 2, 3 , 4 y 5 se mantiene en los términos inicialmente propuestos. La metodología de los temas 6, 7 y 8 se ha modificado en los términos siguientes:

Las clases de teoría y de problemas se han ofrecido en el mismo horario establecido en la asignatura a través de videoconferencias en directo, usando la plataforma Blackboard Collaborate. Para ofrecer mayor flexibilidad al alumno se ha colgado en el aula virtual la grabación de las videoconferencias y el material docente en PDF, para poder ser consultado fuera del horario de clase. Se ha abierto foros temáticos para consulta de dudas a través del aula virtual.

- En relación a las prácticas de laboratorio, las prácticas realizadas antes de la suspensión de la enseñanza presencial se realizaron en los términos inicialmente previstos, mientras que en las restantes se elimina la realización del montaje y toma de datos experimentales y se mantiene el análisis gráfico de resultados y su discusión en base a tablas de datos experimentales que se facilitarán práctica a práctica

4. Evaluación

La parte de teoría y problemas supone el 80% de la calificación y el laboratorio el 20% restante.

Prácticas de Laboratorio:

La realización de las prácticas de laboratorio es obligatoria, y la asistencia al laboratorio también era obligatoria hasta la suspensión de las actividades presenciales. La evaluación se realizará mediante la presentación por escrito de la respuesta a las cuestiones de cada práctica, que en el caso de las sesiones no presenciales se realizará en base a datos experimentales facilitados por el profesor. Aquellos estudiantes que hicieron el laboratorio en el curso 2018-2019 pueden solicitar mantener la nota de dicho curso.

Teoría y Problemas:

La parte de teoría y problemas se evaluará fundamentalmente de forma escrita mediante un examen, de acuerdo al siguiente proceso:

- 1) Primera tarea del Aula Virtual: solicitar a los estudiantes que confirmen su presentación al examen con fecha límite de entrega 48 h antes de la fecha del examen. La respuesta a dicha tarea será la constancia de la presentación del estudiante al examen y permitirá definir el grupo de estudiantes "Asistentes al examen".

- 2) Segunda Tarea del Aula Virtual: trabajo escrito puesto a disposición del grupo "Asistentes al examen". El examen constará de un trabajo escrito que deberá realizarse durante el tiempo establecido a partir de la entrega coordinada, pero nunca superior a la franja horaria establecida en el calendario de exámenes aprobado.

- El examen debe realizarse escrito a mano, donde debe aparecer la fecha de la entrega y el nombre. El alumno debe entregar una copia escaneada (si se dispone de escáner) junto a una foto del examen a través de la aplicación de tareas del aula virtual.

- Se podrá solicitar una entrevista vía video-conferencia para comprobar la autoría del trabajo

y concretar la calificación final de las pruebas cuando el profesor lo precise.

Adicionalmente y en los términos previstos inicialmente en la guía docente, el profesor podrá evaluar a los estudiantes en parte de la asignatura o en la totalidad de la misma, mediante las pruebas de evaluación continua, teniendo en cuenta la parte del temario evaluada tanto en el periodo presencial como en el periodo no presencial. Para ello se ofrecen dos pruebas de evaluación parcial (una completada antes de la situación de emergencia y otra por completar, que seguirá la misma dinámica que la de los exámenes finales) y la posibilidad de entregar trabajos voluntarios (aumentando el peso significativo de esta contribución).

5. Bibliografía

Adicionalmente a la bibliografía establecida inicialmente, se recomienda en particular el material propio del profesorado facilitado vía Aula Virtual y el libro online del servicio de bibliotecas:

- “Física per a la ciencia i la tecnología”, Tipler – Mosca, 6ª edició, 2010