



Universitat de Lleida

DEGREE CURRICULUM **PHYSICS**

Coordination: CARRERA VILANOVA, MIQUEL

Academic year 2020-21

Subject's general information

Subject name	PHYSICS			
Code	102008			
Semester	1st Q(SEMESTER) CONTINUED EVALUATION			
Typology	Degree	Course	Character	Modality
	Bachelor's Degree in Computer Engineering	1	COMMON	Attendance-based
	Double bachelor's degree: Degree in Computer Engineering and Degree in Business Administration and Management	2	COMMON	Attendance-based
Course number of credits (ECTS)	6			
Type of activity, credits, and groups	Activity type	PRAULA	TEORIA	
	Number of credits	3	3	
	Number of groups	5	1	
Coordination	CARRERA VILANOVA, MIQUEL			
Department	ENVIRONMENT AND SOIL SCIENCES			
Important information on data processing	Consult this link for more information.			
Language	Catalan			
Distribution of credits	Miquel Carrera 12 Francesc Perelló 6			

Teaching staff	E-mail addresses	Credits taught by teacher	Office and hour of attention
CARRERA VILANOVA, MIQUEL	miquel.carrera@udl.cat	12	
PERELLO SANS, FRANCESC	francesc.perello@udl.cat	6	

Subject's extra information

Physics is a subject that corresponds to Common module in the Degree curriculum.

1st semester of the 1st curs.

Learning objectives

The course aims to introducing the fundamental principles and basic laws of physics that will enable a better understanding of how works the technologies related to computer science and communications networks. Knowledge that allow, for example, understand the technical conditions of a computer installation according to actual regulations, etc.

For this reason, the program has the following specific objectives:

- Understanding and application of basic principles of electromagnetism related to the concepts of electric and magnetic field.
- The introduction of the basic techniques for analyze electrical circuits
- Determination of currents, voltages and power in DC circuits and AC sinusoidal circuits.
- Determination of currents and voltages in simple circuits containing diodes or transistors.
- Description of an harmonic electromagnetic wave and understanding of the parameters that identify it and determine their properties.
- Determination of the intensity of energy carried by an harmonic electromagnetic wave.
- Knowing the properties of light propagation.
- Understanding the operating principle of the optical fiber and laser.

See also the section "Competences" to have an overview of the context in which these objectives are located.

Competences

Strategic competences of the UdL

- CT5. Acquire knowledge in scientific thinking.

Degree-specific competences

- GII-FB2. Understanding and commanding basic concepts of fields and waves and electromagnetism, theory of electrical circuits, electronic circuits, physical principle of the semiconductors and logical families, electronic and photonic devices, and his application for the resolution of problems in the engineering.

Degree-transversal competences

- EPS1. Capacity to solve problems and prepare and defence arguments inside the area of studies.
- EPS5. Capacity of abstraction and of critical, logical and mathematical thinking.

Subject contents

1. Electrostatic.

- 1.1. Electric charge. Coulomb's Law.
- 1.2. Electric field.
- 1.3. Electrostatic potential energy and electric potential.
- 1.4. Capacitors. Capacity. Stored energy.

2. Circuit Analysis I: DC circuits.

- 2.1. Electric current.
- 2.2. Resistance. Ohm's Law.
- 2.3. Power.
- 2.4. Basic elements of a circuit.
- 2.5. Kirchhoff's laws.
- 2.6. General methods of circuit analysis: method of node voltages and method of network currents.

3. Circuit Analysis II: AC circuits (sinusoidal alternating current)

- 3.1. Elements R, L, C in AC circuits: relationship voltage-intensity. Phasors.
- 3.2. Transient state: RL and RC circuits.
- 3.3. R-L-C circuit with generator. Stationary state.
- 3.3. Complex impedance. Ohm's Law in AC.
- 3.4. Power in AC circuits.
- 3.5. Resonance.
- 3.6. Bandwidth.
- 3.7. Filters.

4. Introduction to Electronics and logic gates.

- 4.1. p-n junction diode.
- 4.2. Light emitting diode (LED).
- 4.3. MOSFET transistor.
- 4.4. CMOS inverter.

5. Waves

- 5.1. Harmonic wave motion. Properties. Wavefunction.
- 5.2. Harmonic electromagnetic waves. Wavefunction. Energy. Intensity.
- 5.3. Generation and detection of electromagnetic waves: electric dipole radiation.
- 5.4. Electromagnetic spectrum.
- 5.5. Propagation properties of the light.
- 5.6. Fiber optic.
- 5.7. Laser.

Methodology

The development of the course is based on three activities:

1) Classes Theory

Online mode

Exposition of the concepts, principles and fundamental relations of each subject

Approach of examples illustrating the application

2) Group classes PraAula

Attendance-based

Discussion and resolution of problems and applications related concepts for each topic

3) Laboratory experiences

In course 20-21 its development will depend on the regulations for the use of laboratories that are issued as a consequence of the adaptations derived from the Covid-19.

Development plan

Week	Subjects/Activities
1	Introduction Unit 1
2	U 1
3	U 2
4	U 2
5	U 3
6	U 3
7	U 3 U 4
8	U 3
9	Evaluation PA1
10	U 4
11	U4
12	U 5 Laboratory: Oscilloscope
13	U 5 Laboratory: circuits RC and RLC
14	U 5
15	U 5

16-17	Evaluation PA2
18	
19	Evaluation: Retake exam

Evaluation

I. Activities that constitute the continuous evaluation throughout the semester:

- COMPULSORY EVALUATION ACTIVITIES

These activities are required in order to pass the course through the process of continuous assessment. When the student have not done any of the three compulsory activities (PA1, PA2, PA3) will get a final maximum of 3.5 points, regardless of the application of percentages can give another result. Therefore, it must be submitted to the Retake exam.

When the student have not done the second compulsory activity PA2, neither Retake Exam, the final qualification will be Not Presented.

1) PA1: **1st Partial Exam**, Week 9

Content (to confirm): units 1,2,3

Percentage: 38 %

2) PA2: **2nd Partial Exam**, Week 16-17

Content (to confirm): units 4, 5

Percentage: 39 %

3) PA3: **Laboratory**

All the following must be fulfilled:

a) Attendance at 2 laboratory sessions

Warning: Being a lab, there is no possibility of recovering them out of traineeships established. Any incident affecting attendance at the scheduled session that has not been communicated promptly to the teacher will NOT be attended.

b) Presentation of a laboratory work report

Percentage: 15 %

- PA4: **OPTIONAL Assessment activity (NOT COMPULSORY)**

PA4: Participation in class. Two activities, throughout the course, consisting of a problem solving or test (classroom or virtual mode). The specific activities will be announced at least one week in advance.

Percentage: 8 %

II. RETAKE

PA5 **Retake Exam**, Week 19

Content: all topics

Grading criteria:

a) The final mark of the students who make the retake exam is given by:

80% Retake exam PA5

15% Laboratory PA3

5% PA4

b) Having done the Retake exam but without having done the Laboratory practices PA3, the final mark will be a maximum of 4, regardless of the result obtained applying the percentages referred in (a).

III. Validation of the Laboratory practices

- The students who passed the Laboratory practices last academic course 19-20, will validate Laboratory and maintain their Laboratory mark for this current course, as far as their final mark was not a NP

- The Laboratory practices passed in previous years to 19-20 are not validated.

Bibliography

Resources

Exercices

Laboratory work guides

References:

(*) TIPLER, P.A., MOSCA, G. *Física para la Ciencia y la Tecnología (6ª ed.)*. Vol.II, (ISBN-978-84-291-4430-7), Ed. Reverté, Barcelona, 2010.

(*) also in older editions

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SEARS, F.W., ZEMANSKY, M.W., YOUNG, H.D., FREEDMAN, R.A. *Física* Vol. 2. Novena edición. Addison-Wesley Longman, 1999.

IRWIN, J. D. *Análisis básico de circuitos en Ingeniería*. Prentice-Hall, 1997. (5ª ed.)

GÓMEZ, P., NIETO, V., ÁLVAREZ, A., MARTÍNEZ, R. *Fundamentos físicos y tecnológicos de la Informática*, Pearson Prentice Hall, 2007.

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RAMOS, A., RIVAS, J.M., JIMÉNEZ, M.A. *Ejercicios de Electricidad*. Ed. Tébar Flores. Madrid.

BURBANO DE ERCILLA, S., BURBANO GARCÍA, E., GRACIA MUÑOZ, C. *Problemas de Física General (26ª ed.)*. Mira Editores, Zaragoza, 1994.

