



Universitat de Lleida

# DEGREE CURRICULUM **PHYSICS**

Academic year 2014-15

## Subject's general information

<b>Subject name</b>	Physics
<b>Code</b>	101402
<b>Semester</b>	1r Q Avaluació Continuada
<b>Typology</b>	Troncal
<b>ECTS credits</b>	9
<b>Theoretical credits</b>	0
<b>Practical credits</b>	0
<b>Office and hour of attention</b>	A concretar
<b>Department</b>	Medi Ambient i Ciències del Sòl
<b>Modality</b>	Presencial
<b>Important information on data processing</b>	Consult <a href="#">this link</a> for more information.
<b>Language</b>	Catalan: 30% Spanish: 70%
<b>Degree</b>	Degree in Architectural Technology
<b>Office and hour of attention</b>	A concretar
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Jordi Barrufet Barque

## Subject's extra information

The subject is in the 1st semester of the 1st year of teaching. It belongs to the module of "Basic Training", specifically in the field "Scientific Fundamentals".

## Learning objectives

See competences

## Competences

### University of Lleida strategic competences

- Correctness in oral and written language.
  - Interpreting the data obtained in an experiment and draw conclusions
  - Derive and determining a requirement set forth in the problems

### Degree-specific competences

- Aptitude to use applied knowledge tied with numeric and infinitesimal calculus, lineal algebra, analytical and differential geometry and the probabilistic and stadistical analysis probabilistic techniques and methods.
  - Set the basic mathematical models out of solid and fluid mechanics, electrical and thermal circuits
  - Interpreting the data obtained in an experiment and draw conclusions
  - Apply appropriate mathematical tools to solve numerical problems
  - Reasoning the numerical results of the issues by applying physical concepts
- Applied knowledge of the principles of general mechanics, static mechanics of structural systems, geometry of masses, principles and methods of the analysis of the elastic behaviour of solids.
  - Extract and understand the basic content of a problem in terms of the fundamental principles of mechanics

### Degree-transversal competences

- Ability to reunite and interpret relevant data, inside an area of study, to express reasons which include reflecting upon relevant subjects of a social, scientific or ethical nature.
  - Reasoning the numerical results of the issues by applying physical concepts
  - Derive and determining a requirement set forth in the problems
  - Extract and understand the basic content of a problem in terms of the fundamental principles of mechanics
- Ability for abstraction and critical, logical and mathematical reasoning.
  - Using different mathematical approaches to solve physical problems
- Ability to analyse and synthesise.
  - Interpreting the data obtained in an experiment and draw conclusions

- Reasoning the numerical results of the issues by applying physical concepts
  - Derive and determining a requirement set forth in the problems
  - Extract and understand the basic content of a problem in terms of the fundamental principles of mechanics
- Ability to resolve problems and elaborate and defend arguments inside an area of study.
    - Reasoning the numerical results of the issues by applying physical concepts
    - Derive and determining a requirement set forth in the problems
    - Extract and understand the basic content of a problem in terms of the fundamental principles of mechanics

## Subject contents

### Topic 0. Systems of Units and Vectors

#### Topic 1. - Systems of forces.

-Moment of forces.

-Torque.

-Resultant of a system of forces.

#### Topic 2. - Distributed Forces.

-Center of gravity and center of mass.

-Moment of inertia.

#### Topic 3. - Statics.

-Types of support.

-Conditions of equilibrium.

-Analysis of Structures.

-Internal Forces

#### Topic 4. - Elasticity.

-Elastic properties of solids.

-Deformation bands.

-Hooke's law.

-Strain-rates and their calculation.

**Topic 5. – Fluid statics.**

- Fundamental equation of fluid statics.
- Forces on submerged surfaces.
- Principle of Archimedes.
- Balancing submerged and floating bodies.

**Topic 6. - FluidDynamics.**

- Continuity equation.
- Bernoulli Theorem.
- Applications and consequences.
- Real fluids.
- Viscosity.Poiseuille-equation.

**Topic 7. Direct Current (DC).**

- Electricity. Current density.
- Ohm's Law. Electrical resistance.
- Generators and receivers. And counter electromotive electromotive force.
- Association of resistance.
- Methods-resolution grids. Leies Kirchhoff.
- Measuring instruments. Voltmeter,ammeter, multimeter.

**Topic 8. Altern Current (AC).**

- Resistors, inductors and capacitorsin AC
- Impedance complex. Phasor diagram. Generalized Ohm's law.
- Parallel and series RLC circuit
- Electrical engineering

**Topic 9. Heat andheat transfer**

- Temperature, heat and internalenergy

-Thermal expansion

-Conduction, convection and radiation

-Thermal-Circuits

## Evaluation

Exámenes:

1<sup>er</sup> parcial (25%), se realizará en el periodo ordinario.

2<sup>o</sup> parcial (40%), se realizará en el periodo ordinario.

Recuperación (65%), se realizará en el periodo ordinario.

Prácticas (15%), se realizarán en horario de grupo mediano. Es necesario haber aprobado las prácticas para poder superar la asignatura.

Trabajo (20%). Se realizará en parejadas y se entregará/expondrá al final del curso.

SERÁ NECESARIA UNA NOTA FINAL PROMEDIO DE LOS EXÁMENES DE 3 PARA PODER APROVAR LA ASIGNATURA

## Bibliography

### BASIC BIBLIOGRAPHY

BEER, F.P., E. RUSSELL JOHNSTON, 1997: Mecánica vectorial para ingenieros: Estática. Ed. McGraw-Hill.

GERE, J.M, TIMOSHENKO, S.P, 1988. Mecánica de materiales. Iberoamérica 4ed.

GILES, R.V., EVETT, J.B., LIU, C., 1994. Mecánica de los fluidos e hidráulica. Ed. Schaum

KLEIN, S.A., 2004. Engineering Equation Solver Manual. F-Chart Software.

MERIAN, I.- 1998 - Estática – Reverté

RAMOS, M.C., IBAÑEZ, M. 2003. Mecánica para Ingeniería. Problemas. Ediciones de la Universidad de Lleida. Eines 43.

RILEY, W.F., STURGES, L.D. - 1995 - Ingeniería mecánica: Estática - Reverté

CASTELLVÍ, F. et al., 1994: Pràctiques de física - Ediciones UdL.

### RECOMMENDED BIBLIOGRAPHY

GONZÁLEZ, F. - 1995 - La física en problemas - Ed. Tebar Flores.

JACKSON, J.H., WIRTZ, H.G. - 1985 - Estática y resistencia de materiales – McGraw Hill

MATAIX, C. 1982. Mecànica de fluidos y máquinas hidráulicas. Ed. Castillo, 1982

WELLS, D.H., SLUSHER, H.S. - 1984 - Física para ingeniería y ciencias – McGraw Hill

VÁZQUEZ, M., E. LÓPEZ, 1988: Mecánica para ingenieros: Estática. Universidad Politécnica de Madrid. EUIT

Obras Públicas.

TIPLER P.A- 1994: FÍSICA - Ed. Reverté.

SERWAY, W.A., JEWET, J.W. 2003. - 1997: Física - Ed. McGraw-Hill.

## **SOFTWARE**

Dr. Frame2.0. Dr. Software LTD.

Equation engineering solver (EES). F-chart software LTD.