

### General Information

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| <b>Name of course:</b>             | <b>PHYSICS FOR CIVIL ENGINEERS</b>   |
| <b>Course Code:</b>                | PMRVHNB091CA   |
| <b>Semester:</b>                   | 2 <sup>nd</sup>  |
| <b>Number of Credits:</b>          | 2  |
| <b>Allotment of Hours per Week</b> | 2 lectures   |
| <b>Evaluation:</b>                 | Signature (with grade)   |
| <b>Prerequisites:</b>              | No prerequisites   |
| <b>Instructor:</b>                 | Dr Adél Len<br>Office: 7624 Pécs, Boszorkány utca 2, No. B307<br>E-mail: len.adel@mik.pte.hu |

### General Course Description

The course provides knowledge that will support a deeper study in civil engineering courses. Provides knowledge and ideas of the basics of classical and modern physics that contributes to the development of a vision of science and what can be done with it.

### Learning objectives

To acquire a basic knowledge of physics useful in engineering. To increase the capacity of planning and solving real problems by elaborating and presenting home-works.

The course will give an introduction into the following themes: Waves, Materials structure, Nuclear physics, Electronics, and Thermodynamics

### Methodology:

**Lectures:** will give the theoretical base knowledge

**Grading:** Accumulated knowledge is tested in **two exams**.

**The midterm exam and the final exam** will test the accumulated **theoretical knowledge**. Both will be considered as completed, when the 50% of the total points will be reached. Failed or skipped midterm exams can be repeated once (first week of the exam period).

## Schedule:

| Week                             | Topic of the lecture   |
|----------------------------------|--|
| Week 1 – 8 <sup>th</sup> Febr    | Introduction. Orientation  |
| Week 2 – 15 <sup>th</sup> Febr   | Physics as a science. Classification of physics. Basic concepts in mechanics. Vectors. One dimensional motion. Two dimensional motion. Motion on space. Force. Momentum. Mechanical energy. Mechanical work. Newton's laws |
| Week 3 – 22 <sup>th</sup> Febr   | Electrodynamics. Electrical energy. Electric field. Magnetic field. Practical considerations.  |
| Week 4 – 1 <sup>th</sup> March   | Electromechanical waves. Optics. Polarization, reflection, interference, refraction, diffraction. Acoustic waves   |
| Week 5 – 8 <sup>th</sup> March   | Atomic physics. Atomic structure. Atomic models. Crystal structure. Amorphous structure.   |
| Week 6 – 15 <sup>th</sup> March  | <i>National feast day – no classes</i>   |
| Week 7 – 22 <sup>th</sup> March  | Nuclear physics. Radioactivity. Nuclear reactors   |
| Week 8 – 29 <sup>th</sup> March  | <i>Midterm exam</i>  |
| Week 9 – 5 <sup>th</sup> April   | Thermodynamics. Internal energy. Equilibrium. Thermodynamic processes.   |
| Week 10 – 12 <sup>th</sup> April | Thermodynamic phase changes. Natural processes. Refrigerator. Air conditioning system.   |
| Week 11 – 19 <sup>th</sup> April | <i>Spring vacation – no classes</i>  |
| Week 12 – 26 <sup>th</sup> April | Heat transfer. Advection. Conduction. Convection. Heat transfer in buildings   |
| Week 13 – 3 <sup>rd</sup> May    | Physical methods for studying the structure of materials I   |
| Week 14 – 10 <sup>th</sup> May   | Physical methods for studying the structure of materials II  |
| Week 15 – 17 <sup>th</sup> May   | <i>Final exam</i>  |

## Attendance

The attendance will affect the final grade (max. 10%). The students are required to be punctual in the class. The continuous following of the subjects and taking notes is mandatory. The subject of the missed class has to be worked out by the student based on the notes of the classmates and reference reading materials.

## Grading

- 10% presence
- 45% Midterm exam
- 45% Final exam

| Grade                 | 5          | 4         | 3         | 2         | 1       |
|-----------------------|------------|-----------|-----------|-----------|---------|
| Evaluation in percent | 85% - 100% | 74% - 84% | 63% - 73% | 51% - 62% | 0 – 50% |

## Bibliography

- Prof. Satindar Baghat: Elementary physics 1. Kinematics, dynamics and thermodynamics, bookboon.com, 2014
- Benjamin Crowell: Simple nature, Editor: Light and Matter, California, 2017
- Benjamin Crowell: Discover physics, Editor: Light and Matter, California, 2017
- John H Lienhard IV, John H Lienhard V: A heat transfertextbook, PHLogiston Press, 2017