

## **Tárgytematika / Course Description**

### **Fundamental Physics for Civil Engineers**

**GKNB\_FKTA006**

**Tárgyfelelős neve /**

**Teacher's name:** dr. Dóka Ottó

**Félév / Semester:** 2022/23/1

**Beszámolási forma /**

**Assesment:** Vizsga

**Tárgy heti óraszám /**

**Teaching hours(week):** 2/0/0

**Tárgy féléves óraszám /**

**Teaching hours(sem.):** 0/0/0

---

### **OKTATÁS CÉLJA / AIM OF THE COURSE**

#### **Description of the curriculum:**

The principal aim of the course is to prepare students for the understanding of physics and laws of nature. The acquired physical knowledge helps the students to understand the professional problems.

---

### **TANTÁRGY TARTALMA / DESCRIPTION**

#### **Topics of the lectures:**

- 1) Topics and research methods of physics. Measurement systems. International System of Units (SI).
- 2) Basic concepts of kinematics. Different types of movement.
- 3) Newton's laws of motion
- 4) Momentum, impulse and angular momentum.
- 5) Work, energy and power
- 6) Conservation of mechanical energy. Work-energy theorem.
- 7) Oscillations. Simple harmonic oscillation. Damped oscillation.
- 8) Forced oscillations and resonance.
- 9) Wave motion.
- 10) Wave propagation and interference.
- 11) Electromagnetic waves. Particle-wave dualism.
- 12) Geometric optics, reflexion and refraction.
- 13) Physical optics. Huygens-Fresnel Principle.
- 14) Interference and diffraction of light.

**Prerequisites:** no

**Credit points:** 4

**The number of contact hours per week (or term):** 2 lectures

**Attendance:** recommended

**Criteria for the signature at the end of the semester:** automatically

**Test requirements:** theoretical questions and solution of problems

**Type of the exam:** written

**Categories:**

1: 0–39%

2: 40–54%

3: 55–69%

4: 70–84%

5: 85–100%

---

**KÖTELEZŐ IRODALOM / OBLIGATORY MATERIAL**

**Obligatory literature:**

S. J. Ling, J. Sanny, W. Moebs et al.: "University Physics", OpenStaxCollege,

- [Volume 1](https://openstax.org/details/books/university-physics-volume-1). Download for free at <https://openstax.org/details/books/university-physics-volume-1>
- [Volume 2](https://openstax.org/details/books/university-physics-volume-2). Download for free at [https://openstax.org/details/books/university-physics-](https://openstax.org/details/books/university-physics-volume-2)

volume-2

- [Volume 3](https://openstax.org/details/books/university-physics-volume-3). Download for free at <https://openstax.org/details/books/university-physics-volume-3>

You can download this book from Google Play or from AppStore.

This book is a general book on physics. We will learn only a small subset of it. Discussed chapters and sections will be defined in the lessons and in the Moodle page.

### **Recommended literature:**

- 1) Paul P. Urone, Roger Hinrichs et.al.: **College Physics**, OpenSTAX College, Rice University, Houston, ISBN-13: 978-1-938168-00-0
- 2) Raymond A. Serway and John W. Jewett, Jr.: *Physics for Scientists and Engineers with Modern Physics* Brooks/Cole . ISBN-13: 978-1-133-95405-7