

F002	Obligatory - Semester 5	<b>Elementary Physics II</b>	L+P+S 2+2+0	ECTS 4
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**Course objectives.** Understanding the fundamental concepts and laws of physics as a whole scientific opinion, which not only explains the vast majority of phenomena in nature, but also allows prediction of new laws.

**Desirable prerequisites.** First-year mathematics courses.

### Syllabus.

1. Electricity. The basic laws of electrostatics and electrodynamics. Elements of the circuit.
2. Magnetism. Magnetic field and magnetic force. Magnetic induction. Alternating current. Maxwell's equations. Wave equation of light.
3. Relativity. Elements of the special theory of relativity.
4. Optics. The basic laws of geometrical optics. Physical optics.
5. Modern physics. The structure of the atom. The laws of radiation, Planck's law, the line spectra and energy levels. Bohr model of the atom. Schroedinger equation.

### Expected learning outcomes:

After completing the course, students are expected to:

- understand the basic laws of electrostatics and electrodynamics;
- understand the basic theses of the theory of special relativity;
- describe and interpret laws and phenomena of geometrical and physical optics correctly;
- compare phenomena in continuum mechanics and atomic physics;
- distinguish between wave and particle properties of matter;
- describe the phenomena associated with the dual nature of the world;
- explain the line spectra and energy levels in atoms;
- describe the idea of Schroedinger's equation;
- apply the acquired knowledge to problem-solving tasks.

**Teaching methods and student assessment:** The exam consists of a written and an oral part. After the completion of lectures and exercises students can take the exam. During the semester, knowledge of students is assessed by mid-term exams, which, if done successfully, can replace the written part of the final examination.

**Can the course be taught in English:** Yes.

### Basic literature:

1. Planinić, J., Osnove fizike 1, Školska knjiga, Zagreb, 2005.
2. Cindro, N., Fizika 2, Školska knjiga, Zagreb, 1988.
3. Planinić, J., Osnove fizike III, Valovi – akustika – optika – uvod u atomsku fiziku, Filozofski fakultet Osijek, 2005.
4. B. Vuković, Reviewed teaching materials available at:  
<http://www.fizika.unios.hr/~branko/feedback.htm>

### Recommended literature:

1. M. Paic, Predavanja iz opće fizike, Parts III and IV, course materials of Sveučilište u Zagrebu, Zagreb, 1975.
2. Young, H., Freedman, R., University Physics, Addison-Wesley Publ., New York, 1996.
3. E. Babić, R. Krsnik i M. Očko. Zbirka riješenih zadataka iz fizike. Školska knjiga, Zagreb 2004.