

<b>Course title:</b>	<b>Electrical engineering materials</b>
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Course code	Course status	Semester	Number of ECTS credits	Lecture hours
131003154	Mandatory	III	3.5	2+1

**Study program:**

Basic academic studies, ELECTRICAL ENGINEERING, study program: Electronics, Telecommunications and Computer engineering (studies last for 6 semesters, 180 ECTS credits).

**Prerequisites:**

No prerequisites required.

**Course aims:**

Synopsis of this course, which represents physics electronic, in most of its part is introduction in the electronics' sciences. Besides the theories of the semiconductors and P-N junctions, the transport problems, continuity equation and some characteristics of the electrical engineering materials are also studied.

**Teacher(s) and assistant(s):**

PhD Slavica Perović – teacher

MSc Predrag Popović - assistant

**Teaching method:**

Lectures and laboratory exercises. Studying and individual solving of the home work problems and seminars. Consultations.

**Course synopsis:**

Preliminary weeks	Preparation and semester enrolment.
I week	Introducing lecture. Curriculum structure. Significance for the electronic. Teaching concept. Course aims.
II week	Physics of the atoms - theoretic basics: Genesis of the Planck's energy quantum. De Broglie's waves. Lasers
III week	Short genesis of the Schrodinger equation, and its implementation.
IV week	Forming of the molecules. Solid-state crystal structure.
V week	Crystal lattice oscillations. Phonon.
VI week	Electron's energy in the crystal. The concept of the effective mass of the electron. Zone model.
VII week	<b>Free week</b>
VIII week	<b>First test</b>
IX week	Vacancy model. Density of the energetic levels, electrons and vacancy statistics.
X week	Transport processes. Diffusion movement. Continuity equation.
XI week	Physics phenomenon at the boundary of different materials. Contact phenomenon. Metal-semiconductor contact.
XII week	<b>Second test</b>
XIII week	P-N junctions. Thickness of the physically resistant layer. Valve property.
XIV week	Capacitance of the P-N junction. Characteristics of the materials in electrical engineering.
XV week	Superconductors. New materials.
XVI week	<b>Final exam</b>
Final week	Administrative procedures.
XVIII-XXI week	Additional lessons, correction of the final exam and administrative procedures.

**STUDENT WORKLOAD**

<u>per week</u>	<u>per semester</u>
<b>3.5 credits x 40/30 = 4 hours and 36 minutes</b>	<b>Teaching and the final exam: (4 h 36 min.) x 16 = 73 h 36 min.</b>
<b>Working hours structure:</b>	<b>Necessary preparation</b> (before semester): 2 x (4 h 36 min.) = 9 h 12 min.
<b>2</b> hours for teaching	<b>Total work hours for the course: 3.5 x 30 hours = 105 hours</b>
<b>1</b> hour for laboratory exercises	<b>Additional hours</b> for preparing correction of the final exam, including the exam taking: up to <b>33</b> hours (the rest of the time from the first two items, up to the total work hours for the course, 105 hours).
<b>1</b> hour and <b>36</b> minutes for individual work, including consultations.	<b>Work hours structure:</b>
	73 h 36 min. (lectures) + 9 h 12 min. (preparation) + 22 hours (additional work)

Lessons attendance is mandatory for students, as well as doing laboratory exercises and both tests.

**Literature:** Slavica M Perović, Fizički osnovi elektronske tehnike, (1997)  
Praktikum za laboratorijske vježbe, ETF, Lab. Za materijale, Podgorica.

**The forms of knowledge testing and grading:**

- Laboratory exercise test carries **10** points.
- Each test carries **20** points (**40** points total).
- Final exam carries **50** points.

Student gets the passing grade by collecting **51** points at least.

**Special remarks for the course:** The teaching is organized for student groups of about 60 students, and laboratory exercises for groups with 10 students. If needed, the course can also be taught in English.

**Teacher(s) who provided the information: PhD Slavica Perović**

**Remark:**