

Course title:	Electrical engineering materials
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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: Power systems and Control (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	Free week
VIII week	First test
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	Second test
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	Final exam
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>
3.5 credits x 40/30 = 4 hours and 36 minutes	Teaching and the final exam: (4 h 36 min.) x 16 = 73 h 36 min.
Working hours structure:	Necessary preparation (before semester): 2 x (4 h 36 min.) = 9 h 12 min.
2 hours for teaching	Total work hours for the course: 3.5 x 30 hours = 105 hours
1 hour for laboratory exercises	Additional hours for preparing correction of the final exam, including the exam taking: up to 33 hours (the rest of the time from the first two items, up to the total work hours for the course, 105 hours).
1 hour and 36 minutes for individual work, including consultations.	Work hours structure:
	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: