

<b>Course title:</b>	<b>Electrical measurements</b>
----------------------	--------------------------------

Course code	Course status	Semester	Number of ECTS credits	Lecture hours
131004210	Mandatory	IV	4.5	2+1+1

**Study program:**

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

**Prerequisites:**

Students have to pass first exams in "Basics of electrical engineering I" and "Basics of electrical engineering II".

**Course aims:**

Through this course, students are introduced with basics of electrical measurement techniques, measurements' errors, standards for the electrical measures, measurement errors, as well as with measuring methods and measuring instruments for electrical measures.

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

PhD Rada Dragović – Ivanović - teacher

**Teaching method:**

Lectures (which include exercises), laboratory exercises. Studying and individual doing practical problems. Consultations.

**Course synopsis:**

Preliminary weeks	Preparation and semester enrolment.
I week	Introduction. Standards for the electrical measures.
II week	Measurement errors.
III week	Measurement errors.
IV week	Electrical measurements' instruments. Dynamic characteristics.
V week	Movable coil instrument. Measurement of the direct voltages and currents, resistances and powers.
VI week	<b>First test</b>
VII week	<b>Free week</b>
VIII week	Instrument with semiconducting rectifiers. Alternative voltages and currents measuring.
IX week	Instrument with thermo-transformers. Induction instruments. Electro-dynamical instruments.
X week	Power measurement of the single-phase and three-phase systems.
XI week	Electricity meters for measurement of the electric energy. Electronic electric meter.
XII week	Measuring bridges for direct current.
XIII week	Measuring compensators. Measuring bridges for alternative current.
XIV week	<b>Second test</b>
XV week	Oscilloscope. Measuring with oscilloscope.
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>
4.5 credits x 40/30 = 6 hours	<b>Teaching and the final exam:</b> (6 hours) x 16 = 96 hours
<b>Working hours structure:</b>	<b>Necessary preparation</b> (before semester): 2 x (6 hours) = 12 hours
2 hours for teaching	<b>Total work hours for the course:</b> 4.5 x 30 hours = 135 hours
1 hour for exercises	<b>Additional hours</b> for preparing correction of the final exam, including the exam taking: up to 27 hours.
1 hour for laboratory exercises	<b>Work hours structure:</b>
2 hours for individual work, including consultations and home exercises.	96 hours (lectures) + 12 hours (preparation) + 27 hours (additional work)

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

**Literature:**

V.Bego, Mjerenja u elektrotehnici, Tehnička knjiga, 2003.  
 R.Dragović-Ivanović, Zbirka riješenih zadataka iz Električnih mjerenja, Univerzitet Crne Gore, 1997.  
 Handout: R.Dragović-Ivanović, Osnovi teorije mjernih metoda za praktičan rad, Podgorica 1997.

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

- Home exercises carry 4x1 points.
- Laboratory exercise test carries 4 points.
- First test carries 20 points.
- Second test carries 22 points.
- 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 50 students, and laboratory exercises for groups with 10 students.

**Teacher(s) who provided the information:** PhD Rada Dragović – Ivanović

**Remark:**