

**Course title: Basics of energetics**

Course code	Course status	Semester	Number of ECTS credits	Lecture hours
131104992	Mandatory	IV	4.5	2+1+2+visits

**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:** Through this subject students of the electronics are introduced with basic ideas, laws and characteristics of the energetics and power systems and their components, as well as with the problems occurring normal and outage states of this systems. Through the exercise lessons, and during the visits, students can better understand material presented at the teaching lessons, and they have a chance to see most of the elements they theoretically learned about.

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

*PhD Sreten Škuletić – teacher, MSc Vladan Radulović - assistant*

**Teaching method:**

Lectures (which include exercises), video and CD presentations, visitation to the electro-energetic and power plants. Consultations.

**Course synopsis:**

Preliminary weeks	Preparation and semester enrolment.
I week	Introducing remarks. Importance of the energy, basic principles, development trends. Terminology in energetics.
II week	Energy states classification (primary, transformed and useful energy states).
III week	Basic information about function and structure of the electro-energetic system. Consumption of the el. energy and consumer categories.
IV week	Daily, monthly and annual load diagrams.
V week	Indicators and el. energy quality standards concerning voltage and frequency.
VI week	<b>First test</b>
VII week	<b>Free week</b>
VIII week	Sources of the electric energy (hydroelectric, steam power plants and alternative energy sources). Electrical generator – basic technical information.
IX week	Overhead and cable power lines – basic characteristics and realizations. Voltage drop and power losses calculations.
X week	Distribution substations (transformers and other elements).
XI week	Transmission, distributive and consumer networks.
XII week	<b>Second test</b>
XIII week	Risks and protection of the electric shock. Network's defects (short circuit and grounding).
XIV week	Principles of the relay protection and monitoring of the electro-energetic systems. SCADA systems.
XV week	Backup power supplies. Measuring and tariffing of the el. energy. Influence of the power systems on the environment.
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>4.5 credits x 40/30 = 6 hours</b>	<b>Teaching and the final exam: (6 hours) x 16 = 96 hours</b>
<b>Working hours structure:</b>	<b>Necessary preparation (before semester): 2 x (6 hours) = 12 hours</b>
<b>2</b> hours for teaching	<b>Total work hours for the course: 4.5 x 30 hours = 135 hours</b>
<b>1</b> hour for exercises	<b>Additional hours for preparing correction of the final exam, including the exam taking: up to 27 hours (the rest of the time from the first two items, up to the total work time for the course, 135 hours).</b>
<b>3</b> hours for individual work, including consultations and home exercises.	<b>Work hours structure:</b>
	96 hours (lectures) + 12 hours (preparation) + 27 hours (additional work)

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

**Literature:** Handout: Sreten Škuletić: Osnovi elektroenergetike, kopija predavanja, 2005  
Hrvoje Požar: "Osnovi energetike" I, II, III, Školska knjiga, Zagreb, 1992.  
Božo Udovičić: "Elektroenergetika", Školska knjiga, Zagreb, 1993.

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

- Lessons attendance and visiting the electro-energetic and power plants carry **10** points.
- 3 home exercises carry **10** points total.
- Two tests carry **30** points (**15** points each).
- Final exam carries **50** points.

Student gets the passing grade by collecting **55** points at least.

**Special remarks for the course:** If needed, the course can also be taught in English.

**Teacher(s) who provided the information: PhD Sreten Škuletić**

**Remark:**