

## Specification for the book of courses

<b>Study program</b>	Electronics and Microsystems		
<b>Module</b>	Electronics and Microsystems		
<b>Type and level of studies</b>	Master studies		
<b>The name of the course</b>	Energy, Environment and Sustainable Development		
<b>Lecturer (for lectures)</b>	Pantić S. Dragan, Aleksić M. Sanja		
<b>Lecturer/associate (for exercises)</b>	Pantić S. Dragan, Aleksić M. Sanja		
<b>Lecturer/associate (for OFE)</b>			
<b>Number of ECTS</b>	5	<b>Course status (obligatory/elective)</b>	Elective
<b>Prerequisites</b>			
<b>Course objectives</b>	<p>The objectives of this course are reflected in: understanding of the environmental impact of electricity, i.e. why they should be taken into consideration when it comes to production and the open electricity market; prioritizing the impact and understanding of their physical properties that leave the consequences for the environment; the study of the best methods for quantification and the implementation of a comparative analysis of the harmful effects on the environment; getting acquainted with the concepts of Microeconomics characterized by market imperfections; learning the basic elements, advantages and disadvantages of various regulatory instruments that control the impact of electricity on the environment; analysis of best practices in the use of regulatory instruments for the purpose of reducing pollution, i.e. increasing the presence of renewable resources, with a focus on regulatory policy at the level of the European Union and beyond; analysis of different case studies, which points students to trends in the development and application of sustainable technologies for the production and consumption of electricity.</p>		
<b>Course outcomes</b>	<p>The student should, after successful completion of the course, be able to: distinguish the various harmful effects that the production of electricity has on the environment, both in cases when using "dirty" energy sources, and in cases of renewable sources; uses different methodologies for quantifying significant environmental impacts and their mutual comparison; be familiar with the basic concepts of Microeconomics that define market imperfections; understand and conduct comparative analysis of various regulatory instruments for controlling the impact of the energy sector on the environment; and follows trends in further development of the energy sector and the application of sustainable technologies.</p>		
<b>Course outline</b>			
<b>Theoretical teaching</b>	<p>Energy: past, present and future. Mechanical energy. Wind Energy. Hydro energy, Biomass energy. Energy derived from fossil fuels. Nuclear energy. Geothermal energy. Solar energy. Electricity and environment. The impact of emissions of harmful gases from thermal power plants to the atmosphere, the environment and human health. The greenhouse effect and global climate change. Assessment and evaluation of the impact of climate change on the environment. Instruments of ecological regulation of the energy sector. Alternative instruments for energy and slime regulation. Public policy on climate change. Energetic efficiency. Analyzes of best practice in the use of regulatory instruments for the purpose of reducing pollution, i.e. increasing the presence of renewable resources, with a focus on regulatory policy at the level of the European Union and beyond. Regulatory policy related to the use of renewable energy sources in the Republic of Serbia.</p>		
<b>Practical teaching (exercises, OFE, study and research)</b>	<p>Analyzes of various studies and cases in developed countries, which aim to familiarize students with the trends of development and application of sustainable technologies for the purpose of production and consumption of electricity.</p>		
<b>Textbooks/references</b>			
1	Reza Toossi, Energy and the Environment: Resources, Technologies, and Imapct, second edition, VerVe Publishers, Inc., Los Angeles, USA, 2008.		
2	Robert A. Ristinen, Jack J. Kraushaar, Energy and the Environment, Wiley, 2nd edition, 2008.		
3	Efsthios E. Michaelides, Energy, the Environment, and Sustainability, CRC Press, 2018.		
4	Michel Andre, Zissis Samaras, Energy and Environment, Volume 1, ISTE Ltd 2016.		

5	Lectures and Exercises ( <a href="http://mikro.elfak.ni.ac.rs/predmeti/energija-okolina-i-odrzivi-razvoj/">http://mikro.elfak.ni.ac.rs/predmeti/energija-okolina-i-odrzivi-razvoj/</a> )			
<b>Number of classes of active education per week during semester/trimester/year</b>				
<b>Lectures</b>	<b>Exercises</b>	<b>OFE</b>	<b>Study and research work</b>	<b>Other classes</b>
2	2	0		
<b>Teaching methods</b>	Lectures, independent studio research work, consultations. Through study research, a student is studying available literature through seminar work or team project.			
<b>Grade (maximum number of points 100)</b>				
<b>Pre-exam duties</b>		<b>Points</b>	<b>Final exam</b>	<b>Points</b>
<b>Activity during lectures</b>		10	<b>Written exam</b>	
<b>Exercises</b>			<b>Oral exam</b>	50
<b>Colloquia</b>				
<b>Projects</b>		40		