

<b>Title</b>	<b>Renewable source of energy</b>						
<b>Code</b>	ZDIA49						
<b>Study Program</b>	Environmental protection						
<b>Semester</b>	3rd						
<b>ECTS</b>	5						
<b>Status</b>	elective						
<b>Lecturer</b>	Davor Kralik						
<b>Co-Lecturers</b>	-						
<b>Requirements for Enrolment</b>	-						
<b>Objectives</b>	Introducing students the principles of creation individual renewable energy (such as energy from biomass, biogas, biodiesel, solar energy, wind energy, geothermal energy, chemical energy) facilities and characteristics of the drive for production of renewable energy, the manner of their utilization in manufacturing , the impact on the environment and the possibility of saving or economic gain.						
<b>Learning Outcomes</b>	<ul style="list-style-type: none"> <li>- Define the legislation of Croatia and EU for renewable energy sources (RES)</li> <li>- Define the sources of biomass and the conversion into energy</li> <li>- Know the characteristics of biogas, the process of anaerobic fermentation of biomass for the production of biogas,</li> <li>- Define facilities for biogas production</li> <li>- Knowledge of biodiesel and its properties, the technology of biodiesel production, the possibility of using biodiesel in agriculture</li> <li>- Dimensioning of different production facilities of RES</li> <li>- The calculations of the energy potential of raw material base for the production of renewable energy</li> <li>- Describe the effect of RES on the environment</li> </ul>						
<b>Connection between Learning Outcomes, Curricular and Student Activities</b>						<b>Credits*</b>	
	<b>Student Activities</b>	<b>ECTS</b>	<b>Learning Outcomes</b>	<b>Curricular Activities</b>	<b>Methods of Assessment</b>	<b>min</b>	<b>max</b>
	Activity in class	1	1-4	Lecture	Record	10	20
	Active participation	1	1-4	Practice	Record	10	20
	Preparation for exam	3	1-4	Final exam	Oral exam	30	60
	<b>Total</b>	<b>5</b>				<b>50</b>	<b>100</b>
<b>Final score:</b> <b>From 50,1-62.5 points: grade 2 (satisfactory)</b> <b>From 62.6 to 75 points: Grade 3 (good)</b> <b>From 75.1 to 87.5 points: grade 4 (very good)</b> <b>From 87.6 to 100 points: Rating 5 (excellent)</b> <b>Final exam: achieved the minimum number of points is sufficient rating and maximum points score results in excellent.</b>							
<b>Consultations</b>							
<b>Learning Activities</b>	<b>Lectures</b>		<b>Seminars</b>		<b>Practice</b>		
<b>Hours</b>	10		0		5		

<b>Contents / Teaching Units</b>	<p>Introducing students with different sources of renewable energy, raw materials origin and the potential for the production of certain energy.</p> <p>Describe the production of energy from biomass, bio-electro-thermal device (BPP), the mandatory security measures, properties of biodiesel, biodiesel production, the EU standards for the use of biodiesel.</p> <p>Describe the process of bioethanol production and its application.</p> <p>Determine the properties of the biomass, sizing facility for biogas, production of biodiesel, calculations related to dimensioning facilities, biodiesel consumption and ensuring necessary quantities of raw materials and the required characteristics, determining the quality of biodiesel.</p> <p>Geothermal energy sources, solar energy; solar collectors, solar cells, fuel cells, wind power, tidal energy, wave energy.</p>
<b>Obligatory Literature</b>	<p>Ljubomir Majdandžić (2010.) Solarni sustavi</p> <p>Boris Labudović i sur. (2009. ) Dizalice topline</p> <p>Ljubomir Majdandžić (2008.) Obnovljivi izvori energije</p> <p>Gordana Kralik (2007.) Svinjogojstvo - biološki i zootehnički principi</p>
<b>Recommended literature</b>	<p>Baličević, I., i sur. (2001.): Agrar energija i ekologija,</p> <p>Graf, W. (1994.): Biogas- Historisches, Biogas für Österreich, Gefördert vom Bundesministerium für Umwelt, Jugend und Familie,</p> <p>Đulbić, M. (1986.): Biogas, dobijanje, korištenje i gradnja uređaja, Beograd,</p> <p>WienHorst Eichhorn (1985): Landtechnik, Stuttgart</p> <p>Petar Kulišić (1991): Novi izvori energije, Školska knjiga Zagreb</p> <p>BIOEN (2001): Projekt biodizel – uvođenje proizvodnje biodizelskoga goriva u RH, Energetski institut "Hrvoje Požar" Zagreb</p>
<b>Requirements for Aquiring Signature</b>	
<b>Type of Exam</b>	Oral exam
<b>Lectures Language</b>	Croatian, English
<b>Quality Monitoring</b>	Poll after finishing class; questioning during class, the possibility of giving verbal or written comments after class; monitoring performance examination