

Course Unit Descriptor

Study Programme: Agricultural Engineering And Information Systems
Course Unit Title: Thermototechnics and renewable energy
Course Unit Code: 19.PTI008
Name of Lecturer(s): Milivoj Radojčin, Associate professor
Type and Level of Studies: Bachelor Degree
Course Status (compulsory/elective): Compulsory
Semester (winter/summer): Summer
Language of instruction: English
Mode of course unit delivery (face-to-face/distance learning): Face-to-face
Number of ECTS Allocated: 6
Prerequisites: None
<p>Course Aims:</p> <p>Introducing students with the specifics of theoretical and practical requirements in the field of thermotechnics and the use of renewable energy sources, systematization of the same and application of concrete methods.</p>
<p>Learning Outcomes:</p> <p>Mastering professional and scientific methods for solving specific problems in the field of thermotechnics and the use of renewable energy sources.</p>
<p>Syllabus:</p> <p><i>Theory</i></p> <p>Introduction to thermodynamics. Equation of state of ideal gases. Equation of the state of a mixture of ideal gases. External influences. The first law of thermodynamics. Enthalpy. The second law of thermodynamics. Polytropic change in the state of ideal gases. Real gases and steam. Transformation heat energy into mechanical work. Cooling processes. Refrigeration appliances and equipment. Binary mixtures (binary solutions). Absorption cooling techniques. Heat transport. Conduction, convection and radiation. Calculation of heat losses. Energy Consumption, Consumption diagrams and consumer characteristics. Energy efficiency of objects. Renewable energy. Biomass. Biogas. Solar energy. Geothermal energy. Wind Energy. Combustion of fuel. Fuel combustion plants. Burners for liquid and gaseous fuels. Heat exchanger. Thermal plants. Choice of type and concept of power plant. Criteria to be met by a thermal power plant. Selection of thermal diagrams and parameters of the thermal power plant, Technological systems of thermal power plants for: fuel supply, protection of the environment, removal of ash and slag; supply and preparation of water. Energy efficiency of thermal power plants. Pipes and pipe fittings. Heating and air conditioning technology. Cooling devices. Humid air. Air conditioners. Heat pumps. Energy efficiency of thermotechnical equipment.</p> <p>Practical classes: Exercises, Other forms of teaching, Study research work</p> <p><i>Practice</i></p> <p>Tasks from thermotechnics. Laboratory and field exercises from thermotechnical devices and renewable energy sources. Seminar or project work from the above mentioned teaching units.</p>
<p>Required Reading:</p> <p>1. Rajput, R. K. ENGINEERING THERMODYNAMICS, College of Information Technology Patiala, New Delhi, India, 2007 p. 966</p>

Weekly Contact Hours:	Lectures: 3	Practical work: 3	
Teaching Methods: Lectures and students group work			
Knowledge Assessment (maximum of 100 points): 100			
Pre-exam obligations	points	Final exam	points
Active class participation	9	written exam	(optional Test or written exam) 40
Test I, II, III and IV		oral exam	51
Preliminary exam(s)		
Seminar(s)			
The methods of knowledge assessment may differ; the table presents only some of the options: written exam, oral exam, project presentation, seminars, etc.			