

Course title	PHYSICS OF RENEWABLE ENERGY SOURCES		
Teaching method	Lecture and four laboratory experiments		
Person responsible for the course	Dr. Hab. Janusz Typek	E-mail address to the person responsible for the course	typjan@zut.edu.pl
Course code (if applicable)		ECTS points	3
Type of course	Optional	Level of course	S1
Semester	Winter or sommer	Language of instruction	English
Hours per week	Lectures 2 ^h + lab 1 ^h	Hours per semester	Lectures 30 ^h + lab 15 ^h
Objectives of the course	To understand physical ideas and issues associated with renewable forms of energy. To gain experience in dealing with practical applications.		
Entry requirements	General knowledge of physics and mathematics. Ability to perform laboratory measurements, general knowledge of measurement techniques and basics of data processing.		
Course contents	Lectures: Introduction to solar energy. Introduction to photovoltaic, band structure of solid state, photovoltaic effect, characteristics of the solar cells. Wind energy-wind power, Betz' law, basic parameters of the wind, wind turbines. Water energy, ocean energy (OTEC, tidal, wave, salinity difference), conversion of water energy. Origin of geothermal energy, geothermal energy systems, heat pumps. Biomass energy and biomass energy systems. Technologies devoted to storage and transfer. Fuel cells. Four laboratory experiments with: photovoltaic solar cells, heat pump, solar collector, fuel cell		
Assessment methods	Laboratory reports (65%) and home prepared essay on selected subject (35%).		
Recommended readings	<ol style="list-style-type: none"> 1. B. Sorensen, Renewable energy, Elsevier 2011 2. Renewable energy focus handbook , Elsevier 2009 		
Additional information	The group should be less than 10 students		