Title	Code
Renewable energy sources (Niekonwencjonalne źródła energii)	**1010402211010410668**
Field: **TECHNICAL PHYSICS**	Year / Semester: **1 / 1**
Specialty: **-**	Course: **core**
Hours: Lectures: **2** Classes: **-** Laboratory: **-** Projects / seminars: **-**	Number of credits: **3**
	Language: **polish**

Lecturer:

prof. dr hab. Danuta Wróbel
Instytut Fizyki
Poznań, ul.Nieszawska 13A
tel. 61 6653177
Danuta.Wrobel@put.poznan.pl

Faculty:

Faculty of Technical Physics
ul. Nieszawska 13A
60-965 Poznań
tel. (061) 665-3160, fax. (061) 665-3201
e-mail: office_dtpf@put.poznan.pl

Status of the course in the study program:

Core course of the study for Technical Physics, Faculty of Technical Physics.

Assumptions and objectives of the course:

To get students some knowledge on:
the role of the Sun and of solar processes in our life, the basic processes occurring in photodevices (conventional photovoltaics), organics-sensitized photocells - new generation of organic photovoltaics based on molecular materials, infrared photovoltaics, solar collectors, wind energy, geothermal energy.

Contents of the course (course description):

1. The Sun as an energy source. Thermal reaction on the Sun. Energy and energy transportation on the Sun.
2. Photosynthesis as a perfect energetic machinery.
3. Hydrogen as an renewable energy source. Technologies of hydrogen production.
4. Fuel cells ? construction and principle of operation.
5. Thermonuclear fusion; plasma. Equipments and Tokamak systems.
6. Conventional non-organic solar cells versus organic photovoltaics systems.
7. Solar energy conversion into electric energy in organic solar cells.
8. Physical phenomena important in organic photovoltaic processes.
9. Photoactive organic systems for photovoltaics - correlation between molecular system structures and photovoltaic effects.
10. Mechanisms of photocurrent generation in organic photovoltaic devices. The role of fullerenes and quantum dots in photoelectric processes.
11. Thermal photovoltaics (TVP)
12. Solar collectors. Central Receiver System.
13. Wind energy
14. Hydroenergy.
15. Geothermal energy.

Visit in a biomass power plant.

Introductory courses and the required pre-knowledge:

Basic knowledge in physics and molecular physics.

Courses form and teaching methods:

Lectures illustrated with Power Point presentations.

Form and terms of complete the course - requirements and assessment methods:

Written test and/or oral examination.

Basic Bibliography:

1. Current articles in Nature, Science, Materials Today
2. H. Haken, H. C. Wolf , Molecular Physics and Elements of Quantum Chemistry, Introduction to Experiments and Theory, Springer, 2004
3. W. Brütting, Physics of organic semiconductors, Wiley ? VCH, Verlag Gmbh&Co. KGaA, 2005.

Additional Bibliography:

-