

(faculty stamp)

COURSE DESCRIPTION

Z1-PU7

WYDANIE N1

Strona 1 z 1

1. Course title: ALTERNATIVE ENERGY SOURCES		2. Course code		
3. Validity of course description: 2012/2013				
4. Level of studies: MSc programme				
5. Mode of studies: intramural studies				
6. Field of study: ENVIRONMENTAL ENGINEERING		(FACULTY SYMBOL) RIE-6		
7. Profile of studies: general academic				
8. Programme: Environmental Engineering - all				
9. Semester: 2				
10. Faculty teaching the course: Department of Heating, Ventilation and Dust Removal Technology; Institute of Thermal Technology				
11. Course instructor: prof. Henryk Foit, dr Andrzej Książdz				
12. Course classification: common directional subject				
13. Course status: compulsory				
14. Language of instruction: Polish/English				
15. Pre-requisite qualifications: Thermodynamics, Fluid Mechanics, Heating Systems				
16. Course objectives: To provide students with basic knowledge on renewable energy sources and technologies of heat and electricity generation from renewables.				
17. Description of learning outcomes:				
Nr	Learning outcomes description	Method of assessment	Teaching methods	Learning outcomes reference code
1.	Student is familiar with phenomena associated with the use of renewable energy sources	written test	lecture	K_W11
2.	Student has general knowledge of the operation of equipment using alternative energy sources	written test	lecture	K_W11
3.	Student is able to evaluate the performance of the selected renewable energy technologies	written test	lecture	K_W10 K_W11 K_U25 K_K02
4.	Student is able to assess the suitability of the use of selected alternative energy sources in the technical solutions for the environmental engineering with special emphasis on heating systems	written test	lecture	K_W10 K_W11 K_U25 K_U21 K_K02
5.				
6.				
7.				
8.				
18. Teaching modes and hours				
30 Lecture / BA /MA Seminar / Class / Project / Laboratory				
19. Syllabus description:				
Semester 5 :				
Classification of alternative energy sources and their potential. The use of solar radiation in active and passive systems. Solar collectors and photovoltaic cells. Principles of construction of solar installations. Indirect use of energy of land, water and air by various types of heat pumps. Heat sources for heat pumps. Principles of construction of heating systems using heat pumps. Geothermal energy and installations for its use. Direct use of energy from the ground. Biomass and installations using its chemical energy. Principles of wind energy utilization. Devices and systems using wind energy. Principles of water energy use. Devices and systems using water energy.				
20. Examination: NO				

21. Primary sources:

Foit H.: Zastosowanie odnawialnych źródeł ciepła w ogrzewnictwie i wentylacji, Wydawnictwo Politechniki Śląskiej, Gliwice 2011
 Lewandowski W.: Proekologiczne odnawialne źródła energii, WNT, Warszawa 2014
 Pluta Z.: Słoneczne instalacje energetyczne, OWPW, Warszawa 2009
 Rubik M.: Pompy ciepła. Poradnik, Warszawa 2006
 Zalewski W.: Pompy ciepła sprężarkowe, sorpcyjne, termoelektryczne, IPPU Masta 2001
 Zawadzki M.: Kolektory słoneczne, pompy ciepła na tak, Polska Ekologia 2003

22. Secondary sources:

Pluta Z.: Podstawy teoretyczne fototermicznej konwersji energii słonecznej, OWPW, Warszawa 2000
 Smolec W.: Fototermiczna konwersja energii słonecznej, PWN, Warszawa 2000
 Recknagel H., Spronger E., Schramek E.: Ogrzewnictwo, Klimatyzacja, ciepła woda, chłodnictwo. OMNI SCALA, Wrocław 2008

23. Total workload required to achieve learning outcomes

Lp.	Teaching mode :	Contact hours / Student workload hours
1	Lecture	30/30
2	Classes	/
3	Laboratory	/
4	Project	/
5	BA/ MA Seminar	/
6	Other	2/17
	Total number of hours	32/47

24. Total hours: 79**25. Number of ECTS credits:** 2**26. Number of ECTS credits allocated for contact hours:** 2**27. Number of ECTS credits allocated for in-practice hours (laboratory classes, projects):** 0**26. Comments:**

Approved:

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(date, Instructor's signature).....
(date, the Director of the Faculty Unit signature)