Z1-PU7	WYDANIE N1	Strona 1 z 2

(*faculty stamp*)

COURSE DESCRIPTION

1. Course title: POWER ENGINEERING MACHINERY	**2. Course code**
3. Validity of course description: 2012/2013	
4. Level of studies: BSc programme	
5. Mode of studies: intramural studies	
6. Field of study: POWER ENGINEERING	(FACULTY SYMBOL) RIE
7. Profile of studies: general	
8. Programme: SUSTAINABLE ENERGY ENGINEERING	
9. Semester: first	
10. Faculty teaching the course: Institute of Power Engineering and Turbomachinery	
11. Course instructor: dr hab. inż. Grzegorz Nowak, dr hab. inż. Ireneusz Szczygieł, prof. nzw. w Pol. Śl.	
12. Course classification: fundamental	
13. Course status: compulsory	
14. Language of instruction: English	
15. Pre-requisite qualifications: English knowledge on B1 level	
16. Course objectives: Providing knowledge of machinery and equipment as well as the fundamentals of their operation. Providing knowledge of naming machines and parts in English.	

17. Description of learning outcomes:

Nr	Learning outcomes description	Method of assessment	Teaching methods	Learning outcomes reference code
1.	Student knows the main types of power machinery	Test	Lecture / Laboratory	K_W17
2.	Student has knowledge of the basics of power machinery operation	Test	Lecture / Laboratory	K_W17 K_W18
3.	Student is able to name in English basic power machines	Test	Lecture / Laboratory	K_U06
4.	Student is able to describe a power unit functioning	Test	Lecture / Laboratory	K_W11 K_W17 K_W18
5.	Student is able to describe operation of basic power machinery	Test	Lecture / Laboratory	K_W11 K_W17 K_W18
6.				
7.				
8.				

18. Teaching modes and hours

Lecture 30 Project 30

19. Syllabus description:

Power machinery and equipment: types and purpose of use. Simplest scheme of coal-fired and nuclear power plant with PWR and BWR reactor. The efficiency of a steam boiler, coal and nuclear power plants, CHP Schemes: with back-pressure turbine and extraction-condensing. Influence of power plants on the environment. Ecological effects of fuel and associated systems. Types of boilers, boiler components, operating devices. Schematic fire-tube and water-tube boiler. Diagram 2-conduit grate boiler and steam boiler. Schematic of the fluidized bed boiler - stationary and circulating. Organic fuels, calorific value and heat of combustion. The ratio of excess air for combustion. The losses in the boiler. Reciprocating internal combustion engines: the basic types, the principle of SI and CI engine and its efficiency. Types of refrigeration equipment. Schematic compression refrigerator gas and steam. Purpose and types of heating pumps. Efficiency of cooling and heating pumps. Schematic of a complete air conditioning system. General information about thermal turbines, turbine stage, impulse and reaction turbines, the basic parameters and characteristics of the turbine constructions of steam and gas turbines, elementary and security control systems for turbines. Turbine condensers. Condenser cooling systems. Basic knowledge of compressors and fans, compressors division, examples of positive displacement compressors, blowers, and special characteristics of compressors, used compressors of different types. General information about the pumps, their distribution and construction, operating parameters of pumps, centrifugal pumps, capacity control, the use of pumps. Types of renewable energy sources. Types of hydroelectric power. Principle of operation and construction of the turbines. Wind power. The construction of wind turbines. Basic information on pipelines, valves and control apparatus - measuring the thermal power stations.

Laboratory:
Getting familiar with the construction and operation of machinery and equipment in the institute laboratories, the real objects of power plants and CHP plants, manufacturing plants of machinery and energy equipment.

20. Examination: no

21. Primary sources:

1. Miller Andrzej: Maszyny i urządzenia cieplne i energetyczne. Wydawnictwa Szkolne i Pedagogiczne, Warszawa, Wyd. 4, 1996
2. Biały Witold „Podstawy maszynoznawstwa", Wyd. Pol. Śl., 2002
3. Wang, Shan K. „Handbook of Air Conditioning and Refrigeration", McGraw-Hill, 2001
4. Matthews, Clifford, Engineers' Guide to Rotating Equipment - The Pocket Reference, John Wiley & Sons, 2001
5. Mechanical Engineer's Reference Book, edited by: Smith, Edward H., 1998 Elsevier

22. Secondary sources:

1. Chmielniak T.: Turbiny cieplne. Podstawy teoretyczne. Wyd. II. Wyd. Pol. Śl. ,Gliwice, 1998.
2. Perycz S.: Turbiny parowe i gazowe. Ossolineum 1992.
3. Stępniewski M.: Pompy. WNT, Warszawa, 1978.
4. Witkowski A.: Sprężarki wirnikowe. Teoria, konstrukcja, eksploatacja. Wydawnictwo Pol, Śl., Wyd. I, Gliwice 2004

23. Total workload required to achieve learning outcomes

Lp.	Teaching mode :	Contact hours / Student workload hours
1	Lecture	30 / 30
2	Classes	/
3	Laboratory	15 / 15
4	Project	/
5	BA/ MA Seminar	/
6	Other	/
	Total number of hours	45 / 45

24. Total hours: 90

25. Number of ECTS credits: 3

26. Number of ECTS credits allocated for contact hours: 2

27. Number of ECTS credits allocated for in-practice hours (laboratory classes, projects): 1

26. Comments:

Approved:

…….
(date, Instructor's signature)

……
(*date , the Director of the Faculty Unit signature)*