(*faculty stamp*)

Z1-PU7	WYDANIE N1	Strona 1 z 1

COURSE DESCRIPTION

1. Course title: THERMO-ECONOMIC ANALYSIS IN POWER ENGINEERING	**2. Course code**
3. Validity of course description: from 2015/2016	
4. Level of studies: 2nd cycle of higher education	
5. Mode of studies: intramural studies	
6. Field of study: **POWER ENGINEERING**	(FACULTY SYMBOL) ISIE
7. Profile of studies: practical	
8. Programme: THERMAL POWER ENGINEERING SYSTEMS	
9. Semester: 2	
10. Faculty teaching the course: Institute of Thermal Technology (RIE-6)	
11. Course instructor: prof. Wojciech Stanek	
12. Course classification: Common subjects	
13. Course status: obligatory	
14. Language of instruction: English	
15. Pre-requisite qualifications: Thermodynamics, Heat Transfer, Fundamentals on Energy Management and on Exergy analysis	
16. Course objectives: Exergy analysis, exergy diagnosis and economic analysis of energy intensive systems.	

17. Description of learning outcomes:

Nr	Learning outcomes description	Method of assessment	Teaching methods	Learning outcomes reference code
1.	Student has the ability for acquisition information from literature and databases.	Exam	Lecture	K_U01
2.	Student has the ability to integrate , the information, interpretation of results and formulation of conclusions	Exam	Lecture	K_U01
3.	Student is aware of importance and understand the non-technical effects of engineering activities	Exam	Lecture	K_K04
4.	Student is aware of social role of technical university graduate, understand the necessity of formulation and transfer of information from the range of energy management and environmental protection to the society	Exam	Lecture	K_K06
5.	Student has the ability to calculate the basic energy, environmental and economic indices characterizing the complex energy systems	Exam Project development Project defence	Lecture / Project	K_W22 K_U03 K_U04 K_U22

18. Teaching modes and hours

Lecture 30 / Project 15

19. Syllabus description:

Characteristic of fundamental technologies in power engineering sector. Domestic and EU energy policy. Energy and exergy indices characterising conventional, nuclear and renewable power plants. Structure of basic power plants and its energetic characteristics. Tool for modelling power systems. Fundamentals of exergy analysis of power plants and industrial systems. Thermo-economic analysis of power plants and industrial systems. Theory of direct and induced exergy losses and its application. Life cycle assessment of power plants from cradle to grave. Exergetic life cycle assessment and thermo-ecological assessment of power plants from cradle to grave. Exergetic assessment of waste energy utilisation. Fundamentals of economic analysis. Economic assessment of power technologies. Application of cumulative emissions calculus to ecological assessment of power plants and industrial systems. Exergetic assessment of sustainability of domestic energy mix.

20. Examination: yes

21. Primary sources:

Szargut J., Ziębik A. Fundamentals of Thermal Engineering (Podstawy energetyki cieplnej). PWN, Warszawa 2000 (in Polish).
Szargut J.: Exergy Analysis: Technical and Ecological Applications. WIT-press, 2005 Southampton, 2005.Role of Alternative Energy Sources: Nuclear Technology Assessment. DOE/NETL-2011/1502. August 8, 2012. National Energy Technology Laboratory. www.netl.doe.gov, last accessed 23.01.2014.
Torres C., Valero A. Thermoeconomic Analysis. University of Zaragoza. www.exergoecology.com

22. Secondary sources:

TAESS Software: www. exergoecology.com

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	15 / 35
5	BA/ MA Seminar	/
6	Other	10 /
	Total number of hours	55 / 65

24. Total hours: 120

25. Number of ECTS credits: 4

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

27. Number of ECTS credits allocated for in-practice hours (laboratory, classes, projects): 2

26. Comments: none

Approved:

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(date, Instructor's signature)

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