Załącznik Nr 5 do Zarz. Nr 33/11/12

(faculty stamp) **Syllabus**

1. Name of the subject: ENERGY RECOVERY FROM WASTE	**2. Course code:**
2. Valid in academic year: 2016-2017	
3. Course: MSc (second degree programme)	
4. Type of studies: full time stationery course	
5 Field of study: POWER ENGINEERING	
6. Profile of studies: General academic	
7. Programme: CLEAN FOSSIL AND ALTERNATIVE FUELS ENERGY (KIC INNOENERGY)	
8. Semester:	
9. Responsible unit: Department of Technologies and Installations for Waste Management (RIE-3)	
10. Lecturer: Prof Jan Nadziakiewicz	
11. Group of subjects: Selective subject	
12. Status: Obligatory	
13. Language of instruction: English	
14. Prerequisites: mathematics, thermodynamics	
15. Course objectives: The course is aimed at delivering the information about modern technologies and environmental restrictions of recovering energy from waste.	

16. Learning outcomes:[1]

Nr	Description of learning outcome	Method of assessments	Type of classes	Reference to learning outcomes
1	Student is able to demonstrate specialist knowledge which enables to solve problems related to the studied programme	Written test, oral answer	Lectures, Project	**K2A_W17**
2	Student is uses commercial calculation software and creates his/her own computer tools for mathematical modelling purposes	Written test, oral answer	Lectures, Project	**K2A_U20**
3	Student is able to conduct extensive analysis of the impact of selected process parameters on process capacity/watt-hour efficiency	Written test	Lectures, Project,	**K2A_U22**

18. Type of classes and their duration

Lecture: 15h Project: 15h

[1] 5-8 learning outcomes should be given

19. Content of the course:

Lectures: Solid waste composition and quantities, Classification of fuels, Energy potential in waste, Waste management and segregation, Waste to energy technology, Emission and energy balance of waste incineration, Refuse Derived Fuel (RDF or SRF) technology.
Lectures are conducted in an interactive way with use of audiovisual tools. During the lecture problem questions/topics are raised, students take part in the discussion about existing solutions as criterions for chosing the best one. Students are encouraged to participate in discussions during lectures and project hours. Students will be able to define the key points of various Waste to Energy technologies from technological and environmental points of view.

Project: Research on composition of various fractions of waste. Analysis of possible properties of fuels produced from the waste and sludge. Energy efficiency of the incineration and co-combustion process. Proposal will be presented to the class and assessed by tutor and group.

20. Examination: no

21. Basic literature:

1. Rogoff M.J., Screve M.: Waste to Energy. Technologies and Project Implementation. Elsevier 2011.
2. Hanjalic K., van de Krol R., Lekic A. (editors): Sustainable Energy Technologies. Springer 2008.
3. Wandrasz J., Pikoń K., Czekalska Z. (editors): Waste to Energy and Environment. Silesia University of Technology. 2010.

22. Other reading:

1. Wilk R.: Clean combustion technologies. Gliwice. 2002.
2. Scientific journals availabale in university network (Scopus, Science direct etc.)

23. Work load of the student necessary to achive the learning outcomes

Lp.	Type of classes	Number of contact hours / student work
1	Lectures	15/10
2	Recitations	/
3	Lab	/
4	Project	15/20
5	Seminar	/
6	Other (participation in consultations associated with project execution)	5/0
	number of hours (subtotal)	35/30

24. Total number of hours: 65

25. Number fo ECTS credits:[2] 2

26. Number of ECTS credit points gained during classes (contact hours): 1

27. Number of ECTS credits gained during practice oriented classes (labs, projects): 1

[2] 1 ECTS point – 30 hours workload

26. Remarks:

Teaching tools: **learning by doing**

The overall assessment consist of two steps:

1. Check of fulfilling of module LO consequently OLOs criteria.
2. Assessment and grading of the quality of students work and reached LO.

EIT OLOs assessed in the subject :

- Value judgments and sustainability competencies (EIT OLO 1)
- Research skills and competencies (EIT OLO 5)
- Intellectual transforming skills and competencies (EIT OLO 6)

The Method of assessments indicated in point 17 includes assessment of learning outcomes and OLOs

Grading:

Grading formula: $FG=PMWF_{lec}*PMG_{lec}+ PMWF_{proj}*PMG_{proj}$

Where:

- FG-final grade
- $PMWF_{lec}$ – Lecture part weighting factor – 0,6
- PMG_{lec} – Grade of achieved LOs relevant to lecture
- $PMWF_{proj}$– Project part weighting factor – 0,4
- PMG_{proj} – Grade of achieved LOs relevant to project

All LO weighting factors associated with part of the module (PM) equal 1.

Accepted:

…….
(Date and signature of the responsible instructor)

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(*date and signature of teh director of the institute, chair, Director of Foreign Language College/head or director of inter-faculty unit)*