(faculty stamp)

COURSE DESCRIPTION

1. Course title: COMPUTER MODELLING IN POWER ENGINEERING	**2. Course code:**
3. Validity of course description: from academic year 2018/2019	
4. Level of studies: undergraduate	
5. Mode of studies: intramural studies (full time studies)	
6. Field of study: Power Engineering	
7. Profile of studies: general academic	
8. Programme: SUSTAINABLE ENERGY ENGINEERING	
9. Semester: 6	
10. Faculty teaching the course: Energy and Environmental Engineering, Department of Thermal Technology	
11. Course instructor: dr hab. inż. Wojciech Adamczyk, Prof. SUT	
12. Course classification: specialization subject	
13. Course status : compulsory	
14. Language of instruction: English	
15. Pre-requisite qualifications: basics of thermodynamics, fluid dynamics, heat and mass transfer	
16. Course objectives: The aim of this course is to provide the knowledge on application of computer modelling tools for solving engineering problems connected with power generation, phase changing and process optimization.	

17. Description of learning outcomes[1]:

Nr	Learning outcomes description	Method of assessments	Teaching methods	Learning outcomes reference code
1	She/he is familiar with numerical methods and procedures, as well as programming concepts and computing capabilities, is familiar with the principles and technologies of environmental protection related to energy processes,	Written exam, project assessment	Lecture, project	K1A_W04 K1A_W15 K1A_W12
2	She/he prepares a well documented analysis, such as a technical report, both in Polish and in English, prepares a well documented analysis, such as a technical report, both in Polish and in English, reads the specialist press (also in English) and self-educates him/herself	Written exam, project assessment	Lecture, project	K1A_U03 K1A_U05 K1A_U05
3	She/he analyses and solves basic physical problems based on the studied laws and methods of physics	Project assessment	Project	K1A_U08 K1A_U10
4	demonstrates an understanding of the need for lifelong learning, especially with a view to improving one's professional and personal competencies, is aware of the importance of understanding non-technical aspects and effects of an engineer's work, as well as its impact on the environment and responsibility for the decisions taken in this respect	Written exam, project assessment	Lecture, project	K1A_K01 K1A_K02

[1] 5-8 learning outcomes should be given

18. Teaching modes and hours

Lecture: 15h, Project: 15h

19. Syllabus description

Lecture: acquainting of students with modern computer systems for modeling engineering problems. Acquainting of students with modern computer systems to design complex systems.

The project consist: of the individual student work supervised by the teacher. During classes student will solve various engineering problems applying CFD techniques and MatLAB:

- Heating (2D problem, energy and mass balance)
- Water evaporation (2D problem, phase changing, particle tracking)
- Gas power cycle in MatLAB (optimization of the selected jet-engine operational parameters using 0D model)
- Multi-parameter calculation in CFD, Genetic Algorithm for design process

20. Examination: yes / ~~no~~ Written exam evaluating knowledge from the lectures, assessment of the projects

21. Basic literature:

- Heat and Mass Transfer (in SI Units), Yunus A. Cengel, Afshin J. Ghajar, McGraw-Hill Education / Asia, 5 edition
- Thermodynamics: an engineering approach, Yunus Cengel, Michael Boles, McGraw-Hill Education
- An Introduction to Computational Fluid Dynamics: The Finite Volume Method, Henk Kaarle Versteeg, Weeratunge Malalasekera, Pearson Education, 2007 - 503

22. Other literature:

- **T.Chmielniak, Technologie Energetyczne, WNT, W-wa,2008**

23. Total workload required to achieve learning outcomes

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

24. Total hours: 30

25. Number of ECTS credits[2]: 3

26. Number of ECTS credits allocated for contact hours: 1

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

28. Comments:

Approved

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(date, Instructor's signature) *(signature of the director of the institute, chair)*

[2] 1 ECTS point – 25-30 hours workload