(*faculty stamp*)

COURSE DESCRIPTION

1. Course title: Fluid Mechanics	**2. Course code**
3. Validity of course description: 2012/2013	
4. Level of studies: 1st cycle of higher education	
5. Mode of studies: intramural studies	
6. Field of study: POWER ENGINEERING	(FACULTY SYMBOL)
7. Profile of studies: overall academic	
8. Programme: SUSTAINABLE ENERGY ENGINEERING	
9. Semester: 4th	
10. Faculty teaching the course: RIE5	
11. Course instructor: dr inż. Andrzej WILK	
12. Course classification: common courses	
13. Course status: compulsory	
14. Language of instruction: English	
15. Pre-requisite qualifications: no	

16. Course objectives: Mastering basic theoretical fluid mechanics. Ability to solve basic problems in the field of statics and dynamics of fluids.

Ability to carry out the basic parameters of flow measurement, interpretation of flow phenomena and to develop results.

17. Description of learning outcomes:

Nr	Learning outcomes description	Method of assessment	Teaching methods	Learning outcomes reference code
1.	He knows the basic properties of fluids	Exam	Lecture	K_U19, K_W13
2.	He knows the basic laws and principles of fluid mechanics	Exam	Lecture	K_U19, K_W13
3.	Correctly interprets the phenomena associated with fluid flow and the possibility of their use known in the art	Exam	Lecture	K_U19, K_W13
4.	Able to solve basic problems in the field of fluid statics	Test	Class	K_U19, K_W13
5.	Able to solve the basic problems of fluid dynamics	Test	Class	K_U19, K_W13
6.	He knows the basic method of measuring of the flow phenomena	The report from the laboratory measurements	Laboratory	K_U19, K_W13
7.	Know how to interpret the phenomenon of flow and is able to develop a performance measurement	The report from the laboratory measurements	Laboratory	K_U19, K_W13
8.				

18. Teaching modes and hours

Lecture / BA /MA Seminar / Class / Project / Laboratory 30 / - -/ - -/ 30 / - - / 15

19. Syllabus description:

Lecture. Issues basic fluid mechanics and its division. Properties of fluids. Forces in fluids. Terms equilibrium. Pascal's Law. Hydrostatic pressure. Hydrostatic thrust. Buoyancy, Archimedes' principle. Continuity equation. The basic equations of motion of viscous fluids. Bernoulli's equation. The dynamic pressure. Measurement of flow rate. The outflow of liquid from the tank. Emptying time of the tank. The equations of motion of viscous fluids. The dynamic similarity of flow. Hydraulic losses in the flow. Calculation of losses in the flow. Laminar and turbulent flows. Selected aspects of the compressible fluid flows.
Class. Solving the examples to illustrate issues of the lecture: the condition of fluid equilibrium, hydrostatic pressure, buoyancy, Archimedes' principle, continuity equation, Bernoulli's equation, dynamic thrust, hydraulic losses in flow.
Laboratory. Measuring the viscosity of the liquid. Relatively stationary state at rotational motion around vertical axis. Stability of floating bodies. Determination of density using a hydrostatic balance. Determination of the hydrodynamic drag coefficient. Time of the tank emptying. Determination of the coefficient of contraction of the hole. Measuring the flow rate through the holes. Measurement of hydraulic losses. Measurements of loss characteristics and gate, ball and globe valves. Siphon. Reynolds experiment. Calibration of danaida. Calibration of orifice flow meter. The study of flow around bodies in a wind tunnel.

20. Examination: YES

21. Primary sources:

Nakayama Y. Introduction to fluid mechanics, Butterworth Heinemann 1999 ISBN 0 340 67649 3

22. Secondary sources:

Daugherty. R. Franzini J. Fluid Mechanics with engineering Applications, McGraw-Hill Book Company, 1977 ISBN 0-07-015427-9

23. Total workload required to achieve learning outcomes

Lp.	Teaching mode :	Contact hours / Student workload hours
1	Lecture	30/45
2	Classes	30/45
3	Laboratory	15/15
4	Project	-/-
5	BA/ MA Seminar	-/-
6	Other	-/-
	Total number of hours	75/105

24. Total hours:180

25. Number of ECTS credits: 6

26. Number of ECTS credits allocated for contact hours: 3

27. Number of ECTS credits allocated for in-practice hours (laboratory classes, projects): 4

26. Comments:

Approved:

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