(*faculty stamp*)

Z1-PU7	WYDANIE N1	Strona 1 z 2

COURSE DESCRIPTION

1. Course title: Mechanics	**2. Course code**
3. Validity of course description: 2018/2019	
4. Level of studies: 1st cycle of higher education	
5. Mode of studies: intramural studies	
6. Field of study: Industrial and Engineering Chemistry	RCH
7. Profile of studies: -	
8. Programme: general	
9. Semester: 4	
10. Faculty unit teaching the course: Department of Chemical Engineering and Process Design	
11. Course instructor: prof. Andrzej Gierczycki, PhD, DSc	
12. Course classification: field	
13. Course status: compulsory	
14. Language of instruction: English	
15. Pre-requisite qualifications: basic knowledge of Mathematics and Physics	
16. Course objectives: An objective of the course is to acquaint students with the fundamental principles of statics in technical mechanics, strength of materials, statics in fluid mechanics and fluid dynamics.	
17. Description of learning outcomes: underneath	

No.	Learning outcomes description	Method of assessment	Teaching methods	Learning outcomes reference code
1.	student knows rules of statics in material systems and possesses the knowledge of simple cases of stresses in bars and methods of their calculations	credit test	lecture	K1A_W02 ++ K1A_W14 +
2.	student knows principles and laws of fluid statics and their practical applications	credit test	lecture	K1A_W02 ++ K1A_W14 +
3.	student knows laws of fluid dynamics, in particular those regarding liquid flow in conduits	credit test	lecture	K1A_W02 ++ K1A_W14 +
4.	student is able to carry out simple calculations concerning statics of material systems	credit test	class	K1A_U24 ++
5.	student is able to carry out simple calculations concerning technical and fluid mechanics	credit test	class	K1A_U24 ++
6.	student understands the necessity of further professional training and the development of his/her engineering and personal competence	observation and discussion	lecture, class, consultation	K1A_K01 +

18. Teaching modes and hours

Lecture / BA /MA Seminar / Class / Project / Laboratory

Lecture sem. 3 - 30 hr / class – sem. 3 - 30 hr

19. Syllabus description

Lectures. The course is divided into two parts: technical mechanics and fluid mechanics. The first part comprises introduction to statics and strength of materials. The following topics are discussed: model of rigid and elastic bodies, reduction of the system of forces, stress and deformation, Hooke's law for normal and shear stresses, permissive stress method, simple cases of stresses in straight bars such as uniaxial tension and compression, torsion of bars with axisymmetrical cross-section area, pure and symmetric bending and pure shear. The second part consists of fluid statics and fluid dynamics. In fluid statics the equilibrium equation of fluid is derived and its application including Pascal's law is

shown. Liquid action on immersed surfaces and bodies is presented under Archimedes' principle and hydrostatic thrust on a plain or curved surface. In fluid dynamics the following topics are discussed: laminar and turbulent flow of liquid, equation of continuity, Bernoulli equation and its corrections for Newtonian liquid, pressure losses in smooth and rough pipes, local pressure losses in elbows, diffusers, confusors and valves. Transportation of liquids by pumps is presented. Steady-state and unsteady-state discharge of liquid from a tank are discussed.

Classes. During classes students solve practical problems connected with technical and fluid mechanics.

20. Examination: no

21. Lectures:

Çengel Y.A., Cimbala J.M., Fluid mechanics. Fundamentals and Applications, McGraw Hill Co., New York 2006.
Belyaev N.M., Strength of Materials (parts I, III, IV), MIR Publishers, Moscow 1979.
Blake A. (Ed.), Handbook of Mechanics, Materials and Structures, John Wiley & Sons, New York 1985.
Gierczycki A.T, Kubica R., Basic Course on Technical and Fluid Mechanics, Wyd. Pol. Śl., Gliwice 2012.
Gil M., Szymczak I., Gierczycki A., Jarzębski A., Thullie J., Chemical Engineering English-Polish Glossary, Wyd. Pol. Śl., Gliwice 2005.
Marghitu D.B., Mechanical Engineer's Handbook, Academic Press, San Diego 2001.

22. Classes:

Beer F.P. and Johnston E.R., jr., Vector Mechanics for Engineers. Statics, McGraw–Hill Book Co., New York 1984.
Daugherty R. L., Franzini J. B., Fluid Mechanics with Engineering Applications, McGraw–Hill Book Co., New York 1977.
Meriam J.L., Engineering Mechanics, vol.1 – Statics, John Wiley & Sons, New York 1987.

23. Total workload required to achieve learning outcomes

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

24. Total hours:120

25. Number of ECTS credits: 4

26. Number of ECTS credits allocated for contact hours: 2,5

27. Number of ECTS credits allocated for in-practice hours (laboratory classes, projects): 1,5

26. Comments:-

Approved:

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(date, Instructor's signature)

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