FACULTY OF PURE AND APPLIED MATHEMATICS
SUBJECT CARD

Name of subject in Polish WSTĘP DO STOSOWANEJ DYNAMIKI CIECZY
Name of subject in English INTRODUCTION TO APPLIED FLUID DYNAMICS
Main field of study (if applicable): APPLIED MATHEMATICS
Specialization (if applicable): Mathematics for Industry and Commerce
Level and form of studies: ~~1st~~/ 2nd* level, full-time / ~~part-time*~~
Kind of subject: ~~obligatory~~ / optional / ~~university-wide*~~
Subject code
Group of courses YES / ~~NO~~*

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	30			30	
Number of hours of total student workload (CNPS)	90			60	
Form of crediting	Examination				
For group of courses mark (X) final course	X				
Number of ECTS points	3			2	
including number of ECTS points for practical classes (P)	2			2	
including number of ECTS points corresponding to classes that require direct participation of lecturers and other academics (BU)	1,5			1,5	

*delete as not necessary

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Student has the standard knowledge of the classical concepts , theorems and methods of real and complex analysis
2. Student has basic knowledge of concepts and methods of the ordinary differential equations

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SUBJECT OBJECTIVES

C1 Study of the advanced methods of mathematical analysis in mathematical modelling of the dynamics fluid phenomena.

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:

PEU_W01 knows advanced theorems of the Real and complex analysis related to the fluid dynamics

PEU_W02 has advanced knowledge concerning mathematical analysis: is able to understand formulations of the studied problems related to the fluid dynamics

relating to skills:
PEU_U01 can construct mathematical models applied in the fluid dynamics

relating to social competences:
PEU_K01 can, without assistance, search for necessary information in the literature, also in foreign languages

PROGRAMME CONTENT		
Lecture		**Number of hours**
Lec 1	Reminder of the vector analysis elements	2
Lec 2	Reminder of the vector analysis elements	2
Lec 3	Reminder of the complex analysis elements	2
Lec 4	Conformal mappings	2
Lec 5	Laws of conservation	2
Lec 6	Equations of motion for an ideal fluid	2
Lec 7	Elementary viscous flow	2
Lec 8	Waves	2
Lec 9	Waves	2
Lec 10	Shock waves modelling	2
Lec 11	Classical aerofoil theory	2
Lec 12	Classical aerofoil theory	2
Lec 13	Nonlinear models in diffusion phenomena	2
Lec 14	Boundary layers	2
Lec 15	Computational fluid dynamics (CFD)	2
	Total hours	**30**

Project		**Number of hours**
Pr 1	Preparation and presentations of projects illustrating theory given in the lectures.	30
	Total hours	**30**

TEACHING TOOLS USED
N1. Lecture – traditional method and presentations N2. Student partial project presentation and final presentation

N3. Consultations N4. Student's self work – work on the project development

EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT

Evaluation (F – forming during semester), P – concluding (at semester end)	Learning outcomes code	Way of evaluating learning outcomes achievement
F1	PEU_W01 PEU_W02 PEU_K01	exam
F2	PEU_U01 PEU_K01	Partial project presentations, final project presentation
C P==0.5*F1+0.5*F2		

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1] B. J. Acheson, Elementary Fluid Dynamics.
[2] H.Ockendon, A.B.Tayler, Inviscid Fluid Flows.

SECONDARY LITERATURE:

[1] J.D. Logan, Applied Mathematics. A Contemporary Approach.
[2] K. Ericsson, D. Estep, P. Hansbo, C. Johnson, Computational Differential Equations.

SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)

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