FACULTY OF PURE AND APPLIED MATHEMATICS
SUBJECT CARD

Name in Polish WSTĘP DO STOSOWANEJ DYNAMIKI CIECZY
Name in English INTRODUCTION TO APPLIED FLUID DYNAMICS
Main field of study (if applicable): APPLIED MATHEMATICS
Level and form of studies: ~~1st~~/ 2nd* level, full-time / ~~part-time*~~
Kind of subject: ~~obligatory~~ / optional / ~~university-wide*~~
Subject code MAT001571
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)	150				
Form of crediting	Examination / ~~crediting with grade*~~				
For group of courses mark (X) final course	X				
Number of ECTS points	5				
including number of ECTS points for practical (P) classes	2			2	
including number of ECTS points for direct teacher-student contact (BK) classes	1,5			1,5	

*delete as applicable

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 model ling of the dynamics fluid phenomena.

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:

PEK_W01 knows advanced theorems of the Real and complex analysis related to the fluid dynamics

PEK_W02 has advanced knowledge concerning mathematical analysis: is able to understand formulations of the studied problems related to the fluid dynamics

relating to skills:
PEK_U01 can construct mathematical models applied in the fluid dynamics

relating to social competences:
PEK_K01 can, without assistance, search for necessary information in the literature, also in foreign languages

PROGRAMME CONTENT		
Form of classes - 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**

Form of classes - 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 EDUCATIONAL EFFECTS ACHIEVEMENT

Evaluation (F – forming (during semester), P –	Educational effect number	Way of evaluating educational effect achievement

concluding (at semester end)		
F1	PEK_W01 PEK_W02 PEK_K01	exam
F2	PEK_U01 PEK_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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Dr inż. Łukasz Płociniczak (Lukasz.Plociniczak@pwr.edu.pl)

MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT
REAL AND COMPLEX ANALYSIS IN MATHEMATICAL MODELLING
MAT001571 AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY
APPLIED MATHEMATICS AND SPECIALIZATION **MATHEMATICS FOR INDUSTRY AND COMMERCE**

Subject educational effect	Correlation between subject educational effect and educational effects defined for main field of study and specialization (if applicable)**	Subject objectives***	Programme content***	Teaching tool number***
PEK_W01 (knowledge)	K2MST_W03 K2MST_mic_W01	C1	Lec1-Lec15	1,3
PEK_W02	K2MST_W06 K2MST_mic_W02 K2MST_mic_W03	C1	Lec1-Lec15	1,3
PEK_U01 (skills)	K2MST_U15 K2MST_U24 K2MST_U25 K2MST_mic_U01 K2MST_mic_U02 K2MST_mic_U03	C1	Pr 1	2,3,4
PEK_K01 (competences)	K2MST_K06 K2MST_mic_K01 K2MST_mic_K02	C1	Lec1-Lec15 Pr 1	1,2,3,4

** - enter symbols for main-field-of-study/specialization educational effects
*** - from table above