Zał. nr 4 do ZW 64/2012

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 MAP2060

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			90	
Form of crediting	Examination / ~~crediting with grade*~~				
For group of courses mark (X) final course	X				
Number of ECTS points	3			3	
including number of ECTS points for practical (P) classes				3	
including number of ECTS points for direct teacher-student contact (BK) classes	2			1	

*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

AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY

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)	K2MIC_W03	C1	Lec1-Lec15	1,3
PEK_W02	K2MIC_W06	C1	Lec1-Lec15	1,3
PEK_U01 (skills)	K2MIC_U15	C1	Pr 1	2,3,4
PEK_K01 (competences)	K2MIC_K06	C1	Lec1-Lec15 Pr 1	1,2,3,4

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

*** - from table above