Zał. nr 4 do ZW 64/2012

FACULTY OF PURE AND APPLIED MATHEMATICS
SUBJECT CARD

Name in Polish WYBRANE ASPEKTY METOD PERTURBACYJNYCH
Name in English Selected Aspects of Perturbation Methods
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 MAT1362
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)	60		60		
Form of crediting	~~Examination /~~ crediting with grade*	~~Examination / crediting with grade*~~	~~Examination / crediting with grade*~~	~~Examination / crediting with grade*~~	~~Examination / crediting with grade*~~
For group of courses mark (X) final course	X				
Number of ECTS points	2		2		
including number of ECTS points for practical (P) classes			2		
including number of ECTS points for direct teacher-student contact (BK) classes	1.5		1.5		

*delete as applicable

MathematicsPREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. The student knows and he is able to use the classic concepts and theorems of mathematical analysis
2. Second He knows and is able to apply basic concepts and methods in the field of differential equations

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SUBJECT OBJECTIVES

C1 Understanding the basic concepts and mastering the basic techniques used in the methods of perturbation**Mathematics**

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:

PEK_W01 has in-depth knowledge of the methods of perturbation

PEK_W02 know the numerical methods used to find approximate solutions mathematical problems (for example, differential equations) pose in the field of applied domain

relating to skills:

PEK_U01 can construct mathematical models used in concrete advanced applications of mathematics

relating to social competences:

PEK_K01 can benefit from the scientific literature in English, including reaching the source materials and make them review

PROGRAMME CONTENT

Form of classes - lecture		**Number of hours**
Lec 1	Examples of problems leading to perturbation method	2
Lec 2	Regular perturbation method	2
Lec 3	Poincare-Lindstedt method	2
Lec 4	Asymptotes	2
Lec 5	Unreliability of the regular perturbation method	2
Lec 6	Singular perturbation method	2
Lec 7	The inner and outer approximations	2
Lec 8	Analysis of shoreline layer	2
Lec 9	Inner approximation and scaling	2
Lec 10	Combining internal and external approximation	2
Lec 11	Uniform approximation	2
Lec 12	Examples of uniform approximation	2
Lec 13	Phenomena associated with the film edge	2
Lec 14	Partial differential equations and perturbation methods	2
Lec 15	Algebraic equations and perturbation methods	2
	Total hours	30

Form of classes - laboratory		**Number of hours**
Lab 1	Solving problems illustrating a lecture given theory using MATLAB	30
	Total hours	30

TEACHING TOOLS USED

N1. Lecture - traditional method

N2. Computer laboratory

N3. Individual consultation

N4. Student's own work - to prepare for the lab

EVALUATION OF SUBJECT EDUCATIONAL EFFECTS ACHIEVEMENT

Evaluation (F – forming (during semester), P – concluding (at semester end)	Educational effect number	Way of evaluating educational effect achievement
F1	PEK_W1 PEK_W2	test
F2	PEK_U1 PEK-K1	verbal responses, short tests, tests, reports
C=0.5*F1+0.5*F2		

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1] E. J. Hinch, Perturbation Methods.
[2] J. David Logan, Applied Mathematics.

SECONDARY LITERATURE:

[1] C.C.Lin, L.A.Segel, Mathematics Applied to Deterministic Problems in the Natural Sciencec, SIAM 1988

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

Prof. dr hab. Wojciech Okrasiński (Wojciech.Okrasinski@pwr.wroc.pl)

MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT

Selected Aspects of Perturbation Methods MAT1362

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)	K2MIC_W04	C1	Lec1-Lec15	1, 3
PEK_W02	K2MIC_W10	C1	Lec1-Lec15	1, 3
PEK_U01 (skills)	K2MIC_U15	C1	Lab1	2, 3, 4
PEK_K01 (competences)	K2MIC_K06	C1	Lec1-Lec15, Lab1	1, 2, 3, 4

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

*** - from table above