Zał. nr 4 do ZW 64/2012

FACULTY OF PURE AND APPLIED MATHEMATICS
SUBJECT CARD

Name in Polish: MODELE UBEZPIECZENIOWE W PRZEMYŚLE
Name in English: Insurance models for industry
Main field of study (if applicable): Applied Mathematics
Specialization (if applicable): Financial and Actuarial Mathematics
Level and form of studies: ~~1st~~/ 2nd* level, full-time / ~~part-time~~*
Kind of subject: ~~obligatory~~ / optional / ~~university-wide~~*
Subject code MAT001567
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 knows and can apply basic concepts of the stochastic processes
2. Student knows principles of MATLAB numerical computing environment

\

SUBJECT OBJECTIVES

C1 Study of the classical concepts and acquisition of the knowledge of insurance models in industry

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:
PEK_W01 knows the most important concepts of insurance models in industry
PEK_W02 knows principles of stochastic modeling in actuarial mathematics

relating to skills:
PEK_U01 can construct actuarial models, that can be applied to industry insurance

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	Types of insurance policies in industry. Solvency II in Non-Life Insurance.	2
Lec 2	Premium principles, risk measures.	2
Lec 3	Franchises and their types. Pricing of net premiums with franchise.	2
Lec 4	Individual risk model.	2
Lec 5	Approximations for total loss in individual risk model	2
Lec 6	Collective risk model. Frequency and severity distributions of claims. Parameters and distributions of aggregate claim amount.	2
Lec 7	Compound Poisson model. Practical consequences of the theorem on the sum of compund Poisson risk.	2
Lec 8	The (a,b) class of distribution. Mixed Poisson model.	2
Lec 9	Risk proces. The adjustment coefficient. The probability of ruin.	4
Lec 10	Distribution of the maximal aggregate coefficient and ruin probability. Pollaczek-Khinchin formula.	3
Lec 11	Approximations of ruin probability in finite and infinite time horizon	2
Lec 12	System Bonus-Malus	2
Lec 13	Credibility theory	3
	Total hours	**30**

Form of classes - laboratory		**Number of hours**
Lab 1	Solving of problems illustrating theory given in the lectures	30
	Total hours	**30**

TEACHING TOOLS USED

N1. Lecture – traditional method
N2. Computer laboratory with MATLAB numerical computation environment
N3. Consultations
N4. Student's self-work – preparation for the laboratory

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_W01 PEK_W02 PEK_K01	exam
F2	PEK_U01 PEK_K01	oral presentations, tests
P=0.5*F1+0.5*F2		

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1] N. L. Bowers i inni, Actuarial Mathematics, The Society of Actuaries, Itasca, Illinois 1997
[2] P. Cizek, W. Haerdle, R. Weron (red.), Statistical tools for finance and insurance, Springer, Berlin, 2011

SECONDARY LITERATURE:

[1] E.Banks, Alternative risk transfer, Wiley, 2003
[2] S. A. Klugman, H. H. Panjer, G. E. Willmot, Loss Models: From Data to Decisions, Wiley, 2012
[3] H. H. Panjer, G. E. Willmot, Insurance risk models, Society of Actuaries, 1992

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

Dr hab. inż. Krzysztof Burnecki, prof. nadzw. (Krzysztof.Burnecki@pwr.edu.pl)
Dr hab. inż. Agnieszka Wyłomańska, prof. nadzw. (Agnieszka.Wylomanska@pwr.edu.pl)

MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT
INSURANCE MODELS FOR INDUSTRY MAT001567
AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY **APPLIED MATHEMATICS**
AND SPECIALIZATION **FINANCIAL AND ACTUARIAL MATHEMATICS**

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_fam_W01 K2MST_fam_W02	C1	Lec 1- Lec 12	1,3
PEK_W02	K2MST_W09 K2MST_fam_W03	C1	Lec 1- Lec 12	1,3
PEK_U01 (skills)	K2MST_U15 K2MST_U24 K2MST_U25 K2MST_fam_U01 K2MST_fam_U02 K2MST_fam_U03	C1	Lab 1	2,3,4
PEK_K01 (competences)	K2MST_K06 K2MST_fam_K01 K2MST_fam_K02	C1	Lec 1- Lec 12, Lab 1	1,2,3,4

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