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: 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 knows and can apply basic concepts of the stochastic processes
2. Student knows principles of MATLAB numerical computing environment

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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
1. Lecture – traditional method 2. Computer laboratory with MATLAB numerical computation environment 3. Consultations 4. Student's self-work – preparation for the laboratory

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	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)

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