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): 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 MAP2061

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~~*				
For group of courses mark (X) final course	X				
Number of ECTS points	2	2			
including number of ECTS points for practical (P) classes	1	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

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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.	2
Lec 3	Franchises and their types. Pricing of net premiums with franchise.	2
Lec 4	Collective risk model. Parameters and distributions of aggregate claim amount.	2
Lec 5	Compound Poisson model. Practical consequences of the theorem on the sum of compund Poisson risk.	2
Lec 6	Approximating the indiviudal risk model.	2
Lec 7	The (a,b) class of distribution. Mixed Poisson model.	2
Lec 8	Risk proces. The adjustment coefficient. The probability of ruin.	4
Lec 9	Distribution of the maximal aggregate coefficient and ruin probability. Pollaczek-Khinchin formula.	4
Lec 10	Approximations of ruin probability in finite and infinite time horizon	2
Lec 11	Types of proportional and non-proportional reinsurance. Recursive formula of the reinsurance premium.	4
Lec 12	Alternative risk transfer. Pricing of CAT bonds.	2
	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	tests
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)

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MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT

INSURANCE MODELS FOR INDUSTRY MAP1994

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_W03	C1	Lec 1- Lec 12	1,3
PEK_W02	K2MIC_W09	C1	Lec 1- Lec 12	1,3
PEK_U01 (skills)	K2MIC_U15	C1	Lab 1	2,3,4
PEK_K01 (competences)	K2MIC_K06	C1	Lec 1- Lec 12, Lab 1	1,2,3,4

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

*** - from table above