Zał. nr 4 do ZW 64/2012

FACULTY OF PURE AND APPLIED MATHEMATICS
SUBJECT CARD

Name in Polish: Matematyka finansowa
Name in English: Economathematics
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 MAT001562
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~~*	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	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 has an elementary knowledge of financial markets and discrete models of financial mathematics

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SUBJECT OBJECTIVES

C1 Learning and mastery of key concepts and methods in the field of financial mathematics

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:
PEK_W01 knows the most important theorems and hypotheses of financial mathematics
PEK_W02 knows the basics of stochastic modeling in financial mathematics
relating to skills:
PEK_U01 can construct mathematical models used in financial mathematics
relating to social competences:
PEK_K01 can by hisself search for information in the literature, even in foreign languages

PROGRAMME CONTENT		
Form of classes - lecture		**Number of hours**
Lec 1	Black-Scholes model	4
Lec 2	Stochastic calculus and its application to the valuation of assets and liabilities and design hedging strategies	4
Lec 3	Feynman-Kac formula and Blacka-Scholes formula	2
Lec 4	Bachelier model	2
Lec 5	Risk-Neutral and Real World scenarios, deflator and its applications	2
Lec 6	Modeling of term structure	2
Lec 7	Vasicek and Cox-Ingerson-Ross models, HJM model, LIBOR model	4
Lec 8	Calibration of interest rate instruments	2
Lec 9	Valuation of debt instruments and interest rate derivatives (bonds, cap/ floor, caplet/floorlet and swaptions)	2
Lec10	Subdiffusive Black-Scholes and Bachelier models	2
Lec11	Fractional Brownian motion in finance	2
Lec12	Gerber-Shiu model, Esscher transform	2
	Total hours	30

Form of classes - class		**Number of hours**
Cl 1	Illustration of all models.. Analytical and computer methods. Examples of pricing derivatives.	30
	Total hours	30

TEACHING TOOLS USED
N1. Lecture problem - traditional method. N2. Problem and counting exercises. N3. Consultations. N4. Student's self work - preparation for exercises.

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	exam

	PEK_W02 PEK_K01	
F2	PEK_U01 PEK_K01	oral responses, tests, small tests
P=0.5*F1+0.5*F2		

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1] A. Weron, R. Weron (1998) Inżynieria finansowa, WNT

SECONDARY LITERATURE:

[1] A. Jakubowski, A. Palczewski, M. Rutkowski, Ł. Stettner (2003) Matematyka finansowa, WNT.
[2] M. Musiela, M. Rutkowski (1997) Martingale methods in financial modelling, Springer.

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

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MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT

ECONOMATHEMATICS MAT001562

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_W09 K2MST_fam_W01	C1	Lec 1-Lec 10	1, 3
PEK_W02	K2MST_W16 K2MST_W17 K2MST_W18 K2MST_fam_W02 K2MST_fam_W03	C1	Lec 1-Lec 10	1, 3
PEK_U01 (skills)	K2MST_U15 K2MST_U20 K2MST_U24 K2MST_U25 K2MST_fam_U01 K2MST_fam_U02 K2MST_fam_U03	C1	Cl 1	2, 3, 4
PEK_K01 (competences)	K2MST_K06 K2MST_fam_K01 K2MST_fam_K02	C1	Lec 1-Lec 10, Cl 1	1, 2, 3, 4

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

*** - from table above