STUDY MODULE DESCRIPTION FORM

Name of the module/subject		Code
Mathematics in economics		**1010341561010344919**
Field of study: **Mathematics**	Profile of study (general academic, practical): **(brak)**	Year /Semester: **3 / 6**
Elective path/specialty: **-**	Subject offered in: **polish**	Course (compulsory, elective): **obligatory**
Cycle of study: **First-cycle studies**	Form of study (full-time,part-time): **full-time**	
No. of hours: Lecture: **2** Classes: **1** Laboratory: **1** Project/seminars: **-**		No. of credits: **7**
Status of the course in the study program (Basic, major, other): **(brak)**	(university-wide, from another field): **(brak)**	
Education areas and fields of science and art: **the sciences**		ECTS distribution (number and %): **8 100%**

Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Calculus. Matrices. Probability theory, random variables, moments.
2	**Skills**	Doing calculations in the above mentioned areas. Basic knowledge of the spreadsheet (Excel).
3	**Social competencies**	Understanding of limitation of their own knowledge. Ability to cooperate within a workgroup.

Assumptions and objectives of the course:

Understanding of consequences of time value of money and the partly probabilistic nature of economic phenomena. Knowledge of basic notions necessary to formulate mathematical models used in economics. Acquaintance with notions concerning financial instruments and with actuarial notation. Using spreadsheets for doing calculations and graphics.

Study outcomes and reference to the educational results for a field of study

Knowledge:

1. Ability to compare various offers of savement plans, credits, investments and insurances. - [K_W01+K_W03+++K_W08 ++]
2. Understanding processes and limitations of economy and modeling them mathematically. - [K_W01 +K_W12 ++]

Skills:

1. Analyze time value of money, especially credits and annuities conditions. Mastering actuarial notation and fundaments of life insurances. - [K_U11 +K_U28 ++K_U37+++]
2. Advanced using of spreadsheets for quantitative analysis of finance problems. - [K_U28]

Social competencies:

1. . Understanding problem of financialization of social life and its negative consequences. - [K_K01+K_K03 ++K_K04+++]

Assessment methods of study outcomes

Lecture:

1. Written exam (theoretic and practical problems).

Practical lessons:

One large test (solving problems). Valuation of activity and student?s answers during classes.

Laboratories:

Valuation of skill in computer use for solving problems. Individual problems to solve at home and making presentation.

Course description

Time value of money. Annuities and perpetuities. Repayment of debts and credit costs. Financial market. Introduction to asset pricing. Demographic model and life-insurance mathematics. Calculation of premiums and reserves. Utility theory.

Basic bibliography:

1. B. Błaszczyszyn, T. Rolski, Podstawy matematyki ubezpieczeń na życie, WNT, 2004

2. K. Jajuga, T. Jajuga, Inwestycje. Instrumenty finansowe, aktywa niefinansowe, ryzyko finansowe, inżynieria finansowa, PWN, Warszawa 2006.

3. J. Klimkowska, M. Podgórska, Matematyka finansowa, PWN, Warszawa 2005

Additional bibliography:

1. N. L. Bowers et al, Actuarial Mathematics, 2nd edition, Society of Actuaries 1997.

2. Additional bibliography: 1. N. L. Bowers et al, Actuarial Mathematics, 2nd edition, Society of Actuaries 1997. 2. A. Weron, R. Weron, Inżynieria finansowa, WNT, Warszawa 1998.

Result of average student's workload

Activity	Time (working hours)
1. Participation in lectures, exercise classes and laboratories.	60
2. Home work: preparing to classes, work with textbook, consulting with the lecturer.	28
3. Preparation to the tests.	8
4. Preparing solutions to laboratory home problems.	22
5. Preparation to the exam. Examination.	22

Student's workload

Source of workload	hours	ECTS
Total workload	140	8
Contact hours	64	0
Practical activities	70	0