

SYLLABUS

REGARDING THE QUALIFICATION CYCLE FROM 2026 TO 2029

ACADEMIC YEAR 2028/2029

1. BASIC COURSE/MODULE INFORMATION

Course/Module title	Insurance Mathematics
Course/Module code *	
Faculty (name of the unit offering the field of study)	Faculty of Exact and Technical Sciences
Name of the unit running the course	Institute of Mathematics
Field of study	Mathematics
Qualification level	First-cycle studies
Profile	General academic
Study mode	Full-time
Year and semester of studies	Year 3, semester 6
Course type	Specialisation course
Language of instruction	English
Coordinator	Jacek Chudziak, PhD, DSc
Course instructor	Jacek Chudziak, PhD, DSc

* - as agreed at the faculty

1.1. Learning format – number of hours and ECTS credits

Semester (no.)	Lectures	Classes	Laboratories	Seminars	Practical classes	Internships	others	ECTS credits
6	30	30						5

1.2. Course delivery methods

- conducted in a traditional way
 involving distance education methods and techniques

1.3. Course/Module assessment (exam, pass with a grade, pass without a grade)

Classes – pass with a grade, lectures – exam

2. PREREQUISITES

Knowledge of the fundamentals of probability theory, statistics, and financial mathematics.

3. OBJECTIVES, LEARNING OUTCOMES, COURSE CONTENT, AND INSTRUCTIONAL METHODS

3.1. Course/Module objectives

O1	Presentation the basic concepts and facts in the field of life insurance and life insurance mathematics.
O2	Familiarization students with the basic methods of life insurance mathematics.

3.2. COURSE/MODULE LEARNING OUTCOMES (TO BE COMPLETED BY THE COORDINATOR)

Learning Outcome	The description of the learning outcome defined for the course/module	Relation to the degree programme outcomes
LO_o1	The student knows and understands the basic types of life insurance and life annuities. He/she is able to list the main types of costs occurring in life insurance. He/she knows the factors that have a significant impact on the amount of insurance premiums.	K_Wo7, K_Wo8
LO_o2	The student is able to analyze life tables and use them to solve problems and perform calculations related to future lifetime. He/she solves problems concerning net premiums and net reserves. He/she is able to determine gross premiums and gross reserves.	K_U16, K_U22
LO_o3	The student understands the importance of risk assessment and risk management in social and economic activity. He/she is aware of the role of life insurance as one of the most important risk management methods. He/she is able to assess the appropriateness of using specific types of life insurance in given situations.	K_Ko4, K_Ko5, K_Ko7

3.3. Course content (to be completed by the coordinator)

A. Lectures

Content outline
<ol style="list-style-type: none"> 1. Risk in human activity. Aspects and risk factors. Risk management methods. Risk assessment in life insurance and its accompanying phenomena. 2. Future lifetime. Aggregation hypothesis. Uniformity hypothesis (uniform distribution of deaths). Life tables. 3. General characteristics of life insurance. Basic types of life insurance policies. Life insurance, pure endowment insurance, endowment insurance, annuity insurance. 4. Elements of life insurance mathematics. Single net premiums. Net premiums and reserves for selected types of life insurance and life annuities. Costs (expenses). Gross premiums and reserves.

B. Classes, laboratories, seminars, practical classes

Content outline
<ol style="list-style-type: none"> 1. Risk in human activity. Aspects and risk factors. Risk management methods. Risk assessment in life insurance and related phenomena. 2. Same topics as lectures (see above). 3. General characteristics of life insurance. Basic types of life insurance: term life, endowment, mixed, and annuity insurance. 4. Elements of life insurance mathematics. Single net premiums. Net premiums and net reserves for selected types of life insurance and annuities. Costs. Gross premiums and gross reserves.

3.4. Methods of Instruction

Classes: problem solving, discussion.

Lectures: lecture with multimedia presentation.

4. Assessment techniques and criteria

4.1 Methods of evaluating learning outcomes

Learning outcome	Methods of assessment of learning outcomes (e.g. test, oral exam, written exam, project, report, observation during classes)	Learning format (lectures, classes,...)
LO-01	observation during classes, discussion, colloquium	lectures, classes

LO-02	observation during classes, discussion, colloquium	lectures, classes
LO-03	observation during classes, discussion	lectures, classes

4.2 Course assessment criteria

Grading policy for classes (exercises)

The basis for the grade are two colloquia. Each colloquium is graded on a scale of 0–20 points. The condition for passing the classes is obtaining at least 10 points from each colloquium. The final grade is determined according to the following scale: 20–23.5 pts – 3.0; 24–27.5 pts – 3.5; 28–31.5 pts – 4.0; 32–35.5 pts – 4.5; 36–40 pts – 5.0.

Lecture credit: based on a passing grade from a final assignment.

5. Total student workload needed to achieve the intended learning outcomes – number of hours and ECTS credits

Activity	Number of hours
Course hours	63
Other contact hours involving the teacher (consultation hours, examinations)	2
Non-contact hours - student's own work (preparation for classes or examinations, projects, etc.)	63
Total number of hours	125
Total number of ECTS credits	5

* One ECTS point corresponds to 25-30 hours of total student workload

6. Internships related to the course/module

Number of hours	<i>Not applicable</i>
Internship regulations and procedures	<i>Not applicable</i>

7. Instructional materials

Compulsory literature:

1. Dickson, D.C.M., Hardy, M. R., Waters, H. R., *Actuarial Mathematics for Life Contingents Risks*, 3rd ed. Cambridge University Press, Cambridge, 2020.
2. Gerber, H. U., *Life Insurance Mathematics*, 4th ed. Springer, Berlin, 1997.

Complementary literature:

1. Promislow, S.D., *Fundamentals of Actuarial Mathematics*, 3rd ed. Wiley, Hoboken, NJ, 2019.

Approved by the Head of the Department or an authorised person