UNIVERSITÀ DI PISA

MATHEMATICAL METHODS FOR INSURANCE

EMANUELE VANNUCCI

Academic year	2023/24
Course	BANCA, FINANZA AZIENDALE E MERCATI FINANZIARI
Code	640PP
Credits	6

Modules	Area	Type	Hours	Teacher(s)
MATHEMATICAL METHODS FOR INSURANCE	SECS-S/06	LEZIONI	42	EMANUELE VANNUCCI

Obiettivi di apprendimento

Conoscenze
Prepare students to deal with economic and financial assessments in conditions of uncertainty
due to problems related to life insurance and non-life insurance issues.

Modalità di verifica delle conoscenze
The assessment will take place both on the theoretical aspects illustrated
during the course, and on the resolution of numerical exercises,
also with the aid of IT tools.

Capacità
The student will be able to understand the fundamental concepts underlying
the economic relationships between the parties involved in the insurance market:
company, policyholders, supervisory bodies.

Modalità di verifica delle capacità
The student must show that he has understood the importance of
measuring and managing the uncertainty inherent in insurance contracts.

Prerequisiti (conoscenze iniziali)
The student is required to know basic general mathematics concepts,
such as calculus of derivatives and solutions of linear systems. We will refer to the concept of discrete and continuous random variables. The meaning of integral calculus will be introduced to account
for distributions of random variables. The fundamental concepts of discounting and capitalization
of classical financial mathematics will be used in conditions of certainty.

Indicazioni metodologiche
The student will have to carry out in parallel the preparation
relating to the theoretical aspects and that relating to
the resolution of numerical exercises (also with the aid of IT tools).

Programma (contenuti dell'insegnamento)
Introduction of the concept of discrete and continuous random variables
and of choice criteria in conditions of uncertainty. Review of financial mathematics. Calculation of premium and mathematical reserve in life insurance. Forms of performance adjustment. Recent Life Insurance Products.
Financial derivatives embedded in life insurance contracts.
Data analysis for biometric risk coverages. The concept of utility and convenience in taking out insurance contracts. The Total Claim Amount as sum of random variables. Main reinsurance treaties and new form or Insurance Risk Transfering.

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Cat-Risk assessment and management through a resilience approach.
Claims reserve: notes. Health insurance assessment through Markov Models.

Bibliografia e materiale didattico

Didactic material including exercises at the link
https://elearning.ec.unipi.it/course/view.php?id=166

Indicazioni per non frequentanti

It is possible to prepare the exam using the didactic material on the website
https://elearning.ec.unipi.it/course/view.php?id=166
and it is possible to contact the teacher for all the necessary clarifications,
both in terms of content and organizational.

Modalità d'esame

The exam takes place in written form, with both theory questions and questions relating to numerical exercises, which will be described and carried out during the course.

Altri riferimenti web

https://elearning.ec.unipi.it/course/view.php?id=166

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