Faculty of Economic, Social and Political Sciences

ACTU3813 Stochastic calculus with application to finance and insurance 2

[30h] 4.5 credits

Teacher(s):	Pierre Ars, Pierre Devolder
Language:	French
Level:	Third cycle

Aims

The aim of this course is to apply the methods of stochastic finance in insurance and pension funds. At the end of the course, the students must be able to apply the concepts of quantitative finance to various concrete problems of insurance

Main themes

The first part is devoted to the application of option theory to the value of life insurance contracts (contract with a garanteed rate or unit linkek contracts). The second part is an introduction to stochastic optimal control and its actuarial applications.

Content and teaching methods

Content
Part 1 / STOCHASTIC METHODS OF VALUATION
1. Classical actuarial valuation
2. Deflators, discounting and fair value
3. Life insurance with participation
4. Unit linked insurance
5. Look back options and pricing
6. Valuation of the surrender option
7. Option on annuity
PART 2 / STOCHASTIC CONTROL
1. Presentation of the financial market
2. Introduction to stochastic control
3. Dynamic optimization in continuous time
4. Introduction to Malliavin calculus
5. Actuarial applications

Other credits in programs

ACTU22MS	Deuxième année du master en sciences actuarielles, à finalité spécialisée	(4.5 credits)	Mandatory
MAP23	Troisième année du programme conduisant au grade d'ingénieur civil en mathématiques appliquées	(3 credits)	