AKTUARVEREINIGUNG
ÖSTERREICHS

ÖSTERREICHISCHE GESELLSCHAFT
FÜR VERSICHERUNGSFACHWISSEN

UNIVERSITÄT
SALZBURG

Salzburg Institute of Actuarial Studies
5020 Salzburg, Hellbrunner Straße 34

Invitation to a Course on Mathematics of Finance

Summer Semester 2007
Salzburg University

Lecturer: Prof. Dr. Uwe Schmock, Vienna University of Technology
Visiting professor at Salzburg University

Dates: On the following weekends Friday from 4 p.m. to 7 p.m. and Saturday from 9 a.m. to 12 noon:

9th and 10th March 2007
30th and 31st March 2007
27th and 28th April 2007
11th and 12th May 2007
1st and 2nd June 2007
22nd and 23rd June 2007

Contents: The course covers all aspects of modern mathematics of finance required to become a fully qualified actuary according to the core syllabus of the International Actuarial Association and the core syllabus of Groupe Consultatif, according to the regulations of the Actuarial Association of Austria (AVÖ), as well as according to the regulations of the German Actuarial Association (DAV). The emphasis lies on stochastic models in discrete time to present the fundamental principles without the mathematically more challenging theory of stochastic analysis. Basic knowledge of probability theory would be of great advantage. Please find the structure of the course below.

Course fees: € 948. The course fees cover the 6 overnight accommodations from Friday to Saturday in a 4 star hotel including breakfast.

The fees for participants who do not need accommodation are € 444.

Information: For further information, please contact Sarah Lederer by fax (+43 662 8044 155) or e-mail (sarah.lederer@sbg.ac.at) with your telephone number. Your questions will be answered as soon as possible.

Registration: Please send the attached registration form by post or fax it to +43 662 8044 155, and arrange for the amount to be transferred (at no cost to the recipient) to the following account before 16th February 2007:

Salzburg Institute of Actuarial Studies (SIAS)
IBAN: AT 792 040 400 000 012 021 BIC: SBGSAT2S

Location: Lecture Hall 414 in the Faculty of Science
A-5020 Salzburg, Hellbrunner Straße 34

Course Structure

1. Mathematics of finance in discrete time

- Bank account, numéraire, stock price processes, discounting
- Trading strategies
- Arbitrage and its localization
- Price systems
- Conditional expectations, martingales, sub- and supermartingales
- Stopping times and their sigma-algebras
- Equivalent martingale measures (with bounded density)
- Theorem of Dalang, Morton and Willinger
- Minimal and maximal prices of financial instruments
- Complete and incomplete financial markets
- Call and put options in the binomial model (CCR model)
- Limit in scaled binomial model
- Black-Scholes formula
- Call-put parity
- American options, Snell envelope

2. Actuarial modelling of dependent credit risks

- Variants of the Bernoulli and Poisson model
- Poisson approximation and approximation quality
- Poisson-gamma mixture distribution, negative binomial distribution
- Compound Poisson distribution
- Specification of the extend CreditRisk+ model
- Recursive calculation of the portfolio loss distribution
- Coherent risk measures and risk contributions
- Application to operational risk modelling

For any necessary preparation Chapters 1–10, 17 and 18 of the book by David Williams, Probability with Martingales (Cambridge University Press), are recommended.

From 30th March 2007 the course lectures on Fridays are accompanied by exercises from 2.30 p.m. to 4 p.m. Registration to the exercises will be made on 9th March 2007. There is no extra cost for the exercises.