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 2009
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:

6th and 7th March 2009
20th and 21st March 2009
3rd and 4th April 2009
15th and 16th May 2009
5th and 6th June 2009
19th and 20th June 2009

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). For continuing professional development (CPD) the course counts as 30 hours. 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: € 444 without hotel accommodation, € 984 with 6 overnight accommodations (from Friday to Saturday) in the Castellani Parkhotel including breakfast. Coffee breaks are included in the fees for all participants.

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 13th February 2009:

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

Location: Lecture Hall 402 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 extended 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 20th March 2009 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 6th March 2009. There is no extra cost for the exercises.