

# Spring 2017 MATH 595/490

## Computational Risk Management of Equity-Linked Insurance

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This course will give an introduction to computational techniques from **stochastic calculus**, with particular focus on quantitative risk management. Equity-linked insurance products are hybrids of traditional life insurance and financial derivatives. The challenges from the modeling and risk management of these products stem from complex guaranteed benefits, dynamic policyholder behavior, and the interaction of mortality and financial risks.

The course is aimed at upper level undergraduate students and graduate students wishing to extend their knowledge and math tools applicable to finance, insurance and risk management. Students will be able to learn various mathematical models and techniques to quantify, assess and manage risks and uncertainty. Specific topics include:

- A brief introduction/overview of continuous-time stochastic calculus;
- No arbitrage pricing and dynamic hedging;
- Risk measures based risk management;
- Monte Carlo simulations and variance reduction techniques;
- Feymann-Kac representation and numerical PDE methods;
- Fourier/Laplace transform methods;
- Regulatory capital requirement and allocation.

Prerequisite: Math 408, 241. (Students without prerequisite can register with instructor's consent.)