Utility Theory in Insurance
- Classes of utility functions
- The expected utility model

Individual Risk Model
- Mixed distributions and risks
- Convolutions and Transforms of cumulative distribution functions
- Approximations: Central Limit Theorem, Translated gamma and Normal power

Collective Risk Models
- Compound distributions
- Convolution formula for a compound cumulative distribution function
- Distributions for the number of claims
- Properties of compound Poisson distributions
- Panjer’s recursion
- Compound distributions and the Fast Fourier Transform
- Approximations for compound distributions
- Comparison between individual and collective risk model

Loss Distributions
- Review: techniques to generate pseudo-random samples and maximum likelihood estimates
- Poisson and Negative Binomial claim number distribution
- Gamma, Inverse Gaussian, Exponential, Lognormal and Pareto claim severity distributions

Ruin Theory
- The classical ruin process
- Lundberg’s inequality
- Ruin probability and capital at ruin
- Explicit expressions for ruin probabilities: the case of exponential distributions
- Approximation of ruin probabilities

Premium Principles and Risk Measures
- Examples of premium principles and their properties
- Characterizations of premium principles
- Premium reduction by coinsurance
- Value-at-Risk and related risk measures

Reinsurance
- Stop-loss reinsurance
- Proportional reinsurance