



# ACMA 820

## Stochastic Analysis of Insurance Portfolios

Fall 2010  
Day Course

Students requiring accommodations as a result of disability, must contact the Centre for Students with Disabilities 778-782-3112 or csdo@sfu.ca

Instructor: [Dr. Gary Parker](#)

### **Prerequisite:**

ACMA 320 & permission of the instructor.

### **Required Text:**

No textbook required.

### **References:**

*Stochastic Analysis of Insurance Portfolios*, G. Parker, 2006

### **Calendar Description:**

Life insurance models. Interest rate models for life insurance: time series, stochastic differential equations, estimation. Portfolios of identical policies. Diversified portfolios.

### **Outline:**

- Basic model for studying life insurance contracts
- Insurance risk: One contract, A portfolio of identical contracts
- Models for the Interest Rates: Time Series; ARMA models
  - Stochastic Differential Equations; Ito formula, Linear Differential Equations, Ornstein-Uhlenbeck process, Second order stochastic differential equations
  - Principle of covariance equivalence
- Life Insurance with Random Interest and Mortality: Present value, net single premium
- Portfolio of Policies with Random Interest and Mortality: moments
- Distribution of the Present Value of Benefits for a Portfolio
  - Approximating the Distribution
  - Limiting Portfolio
- Diversified portfolios

### **Grading Scheme:**

Assignments & Term Project-30%

Midterm-30%

Final-40%

*Grading is subject to change.*

*Students should be aware that they have certain rights to confidentiality concerning the return of course papers and the posting of marks. Please pay careful attention to the options discussed in class at the beginning of the semester. Students are reminded that Academic Honesty is a cornerstone of the acquisition of knowledge. Scholarly integrity is required of all members of the University. Please consult the General Guidelines of the calendar for more details.*

Revised June 2010