



# ACMA 210

## Mathematics of Compound Interest

Fall 2006  
Day Course

Students requiring accommodations as a result of disability, must contact the Centre for Students with Disabilities 604-291-3112 or csdo@sfu.ca

**Instructor: Barbara Sanders**

### **Prerequisite:**

MATH 152. Students with credit for ACMA 310 may not take this course for further credit.

### **Required Text:**

*The Theory of Interest* (2<sup>nd</sup> ed.) by S.G. Kellison, Publisher: Richard D. Irwin Inc.

or

*Mathematics of Investment and Credit* (3<sup>rd</sup> ed.) by Samuel A. Broverman, Publisher: ACTEX

### **References:**

- *Mathematics of Compound Interest* by M.V. Butcher & C.J. Nesbitt, pub: Ulrich's
- *Theory of Interest and Life Contingencies with Pension Applications* by M.M. Parmenter, pub: Actex
- *An Introduction to the Mathematics of Finance* by J.J. McCutcheon & W.F. Scott, pub: Institute and Faculty of Actuaries
- *Financial Mathematics – A Practical Guide for Actuaries and other Business Professionals* (2<sup>nd</sup> ed.) by Ruckman and Francis, pub: BPP Professional Education

### **Calendar Description:**

Measurement of interest, present value. Equations of value. Basic annuities: immediate, due, perpetuity. General annuities. Yield rates: cash flow analysis, reinvestment rate, portfolio and investment year methods. Amortization schedules and sinking funds. Bonds and other securities. Applications: real estate mortgages, depreciation methods. Interest rate disclosure and regulation in Canada. Covers the interest theory portion of Exam FM of the Society of Actuaries.

### **Outline:**

This course is an introduction to the mathematics of compound interest. The topics covered correspond to the course of reading of Exam FM of the Society of Actuaries and they include:

- **Measurement of Interest:**  
Simple interest, compound interest, accumulation functions, present value, effective and nominal rates, forces of interest.
- **Equations of value:**  
Basic problem, numerical results, unknown time, unknown rate of interest.
- **Basic Annuities:**  
Immediate, due, perpetuities.
- **General Annuities:**  
Payments at a different frequency than interest is convertible, continuous annuities, varying annuities.
- **Yield Rates:**  
Cash flow analysis, reinvestment rate, portfolio and investment year methods.
- **Amortization Schedules and Sinking Funds:**  
Outstanding loan balance, varying series of payments, continuous payments.
- **Bonds and Other Securities:**  
Types of securities, price of a bond, premium and discount, yield rates, callable bonds, serial bonds.
- **Applications:**  
Real estate mortgage, depreciation methods, modern financial instruments
- **Other:**  
Inflation, duration, yield curves, forward rates, spot rates, convexity, immunization.

### **Grading Scheme:**

#### ***Option 1:***

Assignments-10%

Midterm 1-25%

Midterm 2-25%

Final Exam-40%

#### ***Option 2:***

Midterm 1-25%

Midterm 2-25%

Final Exam-50%

*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 September 2006