



**ACMA 310-3E  
MATHEMATICS OF COMPOUND INTEREST**

**Fall 2002  
EVENING COURSE**

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**Instructor: KEN COLLINS**

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**Prerequisite:**

MATH 152 must precede or be taken concurrently.

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**Required Text:**

*The Theory of Interest (Second Edition)* by S.G. Kellison, pub: Richard D. Irwin Inc.

**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
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**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. This course covers the syllabus of course 140 of the Society of Actuaries.

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**Outline:**

This course is an introduction to the mathematics of compound interest. The topics covered correspond to those of the course exam 140 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.
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**Grading Scheme:**

Homework 10%  
2 Midterms 40%  
Final 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.*