

SPRING 2017 - ACMA 320 D100

**ACTUARIAL MATHEMATICS I (5)***Class Number: 5984 Delivery Method: In Person***COURSE TIMES + LOCATION:**

Tu, Th 10:30 AM – 12:20 PM  
 AQ 5004, Burnaby

**EXAM TIMES + LOCATION:**

Apr 16, 2017  
 3:30 PM – 6:30 PM  
 BLU 10011, Burnaby

**INSTRUCTOR:**

Cary Tsai  
 cltsai@sfu.ca  
 1 778 782-7044  
 Office: SC-K10563

**PREREQUISITES:**

STAT 285 and ACMA 210 (with a grade of C+ or higher).

## Description

**CALENDAR DESCRIPTION:**

Survival distributions: age at death, life tables, fractional ages, mortality laws, select and ultimate life tables. Life insurance: actuarial present value function (apv), moments of apv, basic life insurance contracts, portfolio. Life annuities: actuarial accumulation function, moments of apv, basic life annuities. Net annual premiums: actuarial equivalence principle, loss function, accumulation type benefits. Actuarial reserves: prospective loss function, basic contracts, recursive equations, fractional durations. Covers part of the syllabus for Exam M of the Society of Actuaries and Exam 3 of the Casualty Actuarial Society, and covers practical applications such as computational aspects of pricing and reserving, and risk measurement of insurance portfolios. Quantitative.

**COURSE DETAILS:****Course Outline:**

This course covers the fundamentals of Actuarial Mathematics in life insurance. The topics covered correspond to about the first half of the syllabus of Exam MLC of the Society of Actuaries and they include the following:

1. Survival Models: Future lifetime; actuarial functions; fundamental theorems for calculating moments of actuarial functions; analytical laws of mortality.
2. Life Tables and Selection: Life tables; stochastic and deterministic approaches to life table functions; assumptions for fractional ages; select and ultimate survival models; mortality projection
3. Net Single Premiums for Life Insurance Contracts: Definition using a stochastic approach; distribution of the actuarial present value function for different insurance contracts.
4. Life Annuities: Actuarial accumulation function; aggregate payment and current payment techniques; life annuities with monthly payments - UDD; recursive equations.
5. Net Annual Premiums: Actuarial equivalence principle; basic contracts; monthly premiums; life insurance with accumulation type benefits.
6. Reserves: Definition of prospective loss; basic contracts; monthly premium reserves: recursive equations for discrete reserves, reserves at fractional durations, allocation of the loss to policy years.

This course is accredited under the Canadian Institute of Actuaries (CIA) University Accreditation Program (UAP) for the 2016-2017 academic year. Achievement of the established exemption grade in this course may qualify a student for exemptions from writing certain preliminary exams. Please note, a combination of courses may be required to achieve a single exemption. Please see <http://www.cia-ica.ca/membership/uap> for full details.

## Grading

Quizzes and Assignments	10%
Midterm 1	25%
Midterm 2	25%
Final	40%

### NOTES:

***All grading is subject to change.***

## Materials

### REQUIRED READING:

#### Required Text:

***Actuarial Mathematics for Life Contingent Risks, 2<sup>nd</sup> ed.* by Dickson, Hardy & Waters.; Publisher: Cambridge University Press**

### RECOMMENDED READING:

- Models for Quantifying Risk* by R. Cunningham, T. Herzog, R. London, Publisher: ACTEX
- ACTEX Study Manual for Exam M of the SOA* by Matt Hassett, Donald G. Stewart, Amy Steeby, publisher: ACTEX.
- Life Contingencies* by C.W. Jordan; publisher: SOA. *Life Insurance Mathematics* by H.U. Gerber; publisher: Springer-Verlag.
- The Mathematics of Life Insurance* by Menge and Fisher; publisher: Ulrich's.

### DEPARTMENT UNDERGRADUATE NOTES:

#### Students with Disabilities:

Students requiring accommodations as a result of disability must contact the Centre for Students with Disabilities 778-782-3112 or [csdo@sfu.ca](mailto:csdo@sfu.ca)

#### Tutor Requests:

Students looking for a Tutor should visit <http://www.stat.sfu.ca/teaching/need-a-tutor-.html>. We accept no responsibility for the consequences of any actions taken related to tutors.

### REGISTRAR NOTES:

SFU's Academic Integrity web site <http://students.sfu.ca/academicintegrity.html> is filled with information on what is meant by academic dishonesty, where you can find resources to help with your studies and the consequences of cheating. Check out the site for more information and videos that help explain the issues in plain English.

Each student is responsible for his or her conduct as it affects the University community. Academic dishonesty, in whatever form, is ultimately destructive of the values of the University. Furthermore, it is unfair and discouraging to the majority of students who pursue their studies honestly. Scholarly integrity is required of all members of the University. <http://www.sfu.ca/policies/gazette/student/s10-01.html>

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