

Mathematics of Life Contingencies 2, MATH 3281 3.00 W

<http://edfurman.info.yorku.ca/teaching/math3280>

Lecture time and location	13:30-14:30 MWF	HNE 037
Tutorial time and location	16:30-17:30 M	HNE 037
Instructor name and contacts	Ed Furman	efurman@mathstat.yorku.ca http://edfurman.info.yorku.ca/
Office hours and location	by appointment (by appointment)	N602 Ross, Ext 33768
TA name and contacts	Mingfu Wang	morgan08@yorku.ca

Brief course description. This is an intermediate level course on the mathematics of life contingencies. It builds on MATH 3280 3.00 and develops theoretical basis for pricing and supporting life-contingent products. The topics include: economics of insurance, general insurances and annuities, (benefit) premiums and reserves, analysis of reserves, Hattendorf's theorem. The course, along with MATH 3280 3.00 and MATH 4430 3.00 (or MATH 4431 3.00) ensures an adequate preparation for the MLC exam of the Society of Actuaries.

Prerequisites. MATH 3280 3.00.

Topics. The subjects to be covered include but are not limited to:

- Economics of insurance. Utility functions and risk appetite. Feasibility of insurance contracts.
- Actuarial present values of general insurances and annuities.
- General life insurance pricing.
- Solvency and the notion of reserves.
- Analysis of reserves and the Hattendorf's theorem.
- Multiple state models and insurance pricing.

Learning objectives. Students who complete this course will:

- (1) Understand the conditions for the feasibility of insurance contracts.
- (2) Be able to price quite general life insurance treaties.
- (3) Assess the riskiness inherent in general insurance policies.
- (4) Determine solvency conditions for policies of interest.
- (5) Realize the implications of dependence on Points 2 – 4 above.
- (6) Be adequately prepared to take the Life Contingencies exam of the Society of Actuaries (Exam LTAM) if the student passes the sequence MATH 3280 3.00, MATH 3281 3.00, MATH 4230 3.00 (or MATH 4231 3.00).

Required reading. Lecture notes (check the website mentioned above regularly), and one of the following:

BOWERS, N. L., HICKMAN, J. C., NESBITT, C. J., JONES, D. A. AND GERBER, H. U. (1997). *Actuarial Mathematics*, 2nd edition, Society of Actuaries, Itasca, Illinois.

CUNNINGHAM, R.J.,HERZOG, T.N., LONDON, R.L. (2013). *Models for Quantifying Risk*. ACTEX Publications, 5th Ed.

Evaluation. The marking scheme involves: 1.) One midterm test (Feb, 25th) = 20%, 2.) Quizzes = 15%, 3.) Home assignments = 10%, and 4.) Final exam = 55%.

Academic honesty. Please, thoroughly familiarize yourself with the policy of the University Senate on academic honesty, found at <http://www.yorku.ca/secretariat/policies/document.php?document=69>