

22S:185 Asset and Liability Management Spring Semester 2007

Instructor: Dr. E.S.W. Shiu Office: 362 Schaeffer Hall
Phone: 335 2580 E-mail: eshiu@stat.uiowa.edu
Office Hours: Monday (2:30-3:30 PM), Wednesday and Friday (12:30-1:30 PM) or by
appointment
Department: Statistics & Actuarial Science, 241 SH Phone: 335 2082
D.E.O.: Dr. Luke Tierney Phone: 335 0712 E-mail: luke@stat.uiowa.edu

The textbook is Panjer, H.H. (editor) (1998). *Financial Economics: With Applications to Investments, Insurance, and Pensions*. Schaumburg, Ill.: The Actuarial Foundation. This was a textbook for SOA Exam 6.

There will be two midterm examinations, to be held on March 9 (Friday, 6:30-9 PM), and April 14 (Saturday, 9:30-12 noon). **You are to use the official CAS/SOA calculators during exams.** Tentatively, the final grade will be calculated by the formula

$$H.W. 10\% + \text{Midterms } 2 \times 25\% + \text{Final } 40\%$$

Tentative topics to be covered are:

- Interest Rate Risk (C-3 Risk)
- Term Structure of Interest Rates (Spot Rates, Forward Rates, Yields)
- Redington's Theory of Immunization (Macaulay Duration, Modified Duration, Dollar Duration, Convexity); Problems with Immunization Theory
- Generalization of Redington's Theory (Fisher-Weil Model)
- Cash Flow Matching (Linear Programming Algorithms)
- Principle of No Arbitrage and the Fundamental Theorem of Asset Pricing (Farkas Lemma, Separating Hyperplane, Equivalent Martingale Probability Measure)
- Option Pricing Theory
- Cox-Ross-Rubinstein Binomial Model
- Discrete interest rate models (Black-Derman-Toy, Ho-Lee)
- Valuation of Interest Sensitive Cashflows
- Actuarial Approach to Option Pricing Theory
- Black-Scholes Partial Differential Equation (Self-financing Strategies)
- Black-Scholes Formula, and Extensions by Esscher Transforms
- Method of Forward-Neutral Probability Measure
- Elementary Stochastic Calculus (Ito's Lemma, Brownian Motion)
- Continuous-Time Term Structure of Interest Rate Models (Vasicek, Cox-Ingersoll-Ross, Heath-Jarrow-Morton)
- Applications to Insurance/Annuity Products: SPDAs, Variable Annuities, Equity-Indexed Annuities, Fair Value of Liabilities

A list of independent tutors can be found at <http://www.stat.uiowa.edu/courses/tutors.html>

Course policies are governed by the College of Liberal Arts and Sciences.

University policies regarding Student Rights and Responsibilities can be found at http://www.clas.uiowa.edu/students/academic_handbook/

I need to hear from anyone who has a disability which may require some modification of seating, testing, or other class requirements so that appropriate arrangements may be made. Please see me after class or during my office hours.
