

STAT 473: Actuarial Models, Spring 2007, Purdue University¹

• General Information

Instructor: Professor Frederi G. VIENS
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Office Hours: Th Th 9:40-10:25am & 1:30-2:15 pm, in MATH 504
Class Hours: TTH 12:00-1:15 pm in REC 313
Textbooks: Klugman, Panjer, Willmot: Loss Models, from Data to Decisions, 2nd Ed (2004)
R.L. McDonald: Derivatives Markets, 2nd Ed (2006)

- **Catalog Course Description.** Continuation of STAT 472. Together, these courses cover contingent payment models, survival models, frequency and severity models, compound distribution models, simulation models, stochastic process models and ruin models. *This year, to reflect the changes in SOA exam M, we will also cover a number of financial economics topics.*

- **Homework.** Homework assignments will be due roughly every week-and-a-half, except weeks that have a midterm. Selected portions of the assignments will be graded. You are encouraged to discuss the assignments with other students but you must write up your homework independently; identical solutions are NOT acceptable. Your homework must reflect YOUR understanding of the material. See note below about **plagiarism**¹. Late homeworks will not be accepted. Your total homework grade will constitute at least **10%** but no more than **20 %** of your total grade in the class.

- **Exams.** All exams will be closed-book, closed-notes, except possibly for a “crib” sheet.

- Two **Midterm Exams** will be given during the regular class period, on dates to be assigned. These exams will cover all material seen in class up to and including a week before each exam. Each midterm exam will be worth at least **40%** but no more than **50%** of your total grade in the class. We anticipate that the material on financial economics (Black-Scholes theory) will be covered after the second midterm, and that there will be no in-class exam on this new material.
- There will be **No Final Exam** in this course.

• Outline of Course Topics

The following list of topics corresponds approximately to those given on the Society of Actuaries website for the requirements for Exam M (multiple decrements, plus financial economics) and the Loss Models portion of Exam C. Chapter numbers refer to the Loss Models text, and, for the first topic, to the textbook used in STAT 472.

- – Multiple Decrement Models
Chapter 10 (10.1, 10.2, 10.3, 10.5, 10.6) and Chapter 11 (11.1, 11.2, 11.3) in Bowers, Gerber, Hickman, Jones & Nesbitt, Actuarial Mathematics, 2nd Edition (1997)
- Classifying and Creating Distributions
Chapter 4, sections 4.1-4.4, 4.6 (except 4.6.6, 4.6.8, 4.6.12)
- Frequency and Severity with coverage modifications
Chapter 5
- Aggregate Loss Models:
Chapter 6, sections 6.1-6.3, 6.7
- Rational valuation of derivative securities (Black-Scholes option pricing, with delta hedging for risk management)
- (*time permitting*) Stochastic Interest Rates models (Vasicek, CIR, Black-Derman-Toy)
- (*time permitting*) Stochastic processes:
The Poisson Process *Ch. 8, section 8.1.1*
Brownian motion *Ch. 8, sections 8.6, 8.7*