STAT 453/BEPP 453/STAT 853/BEPP 853
ACTUARIAL STATISTICS
Fall 2018

Reading material:

Klugman, Panjer, Willmot: "Loss Models: From Data to Decisions", 4th ed., John Wiley
(bookstore or Lippincott reserve). Chapters 8 and 9.

Study note from the Society of Actuaries: Daniel "Poisson Processes and mixture
distributions" (in course pack)

Study note from the Society of Actuaries: Daniel: "Multi-State Transition Models with
Actuarial Applications" (in course pack)

Dickson, Hardy, Waters: Actuarial Mathematics for Life Contingent Risks, 2nd ed.,
Chapter 8, 8.1 – 8.7.

Course pack: www.study.net. Password: INSR2010

Office hours: Tuesdays and Thursday, 3:00-4:45, and by appointment, JMHH 458
(lemaire@wharton.upenn.edu)

Note: If you hit "**Reply**' to an e-mail from me to the class, you are replying to the whole
class

1. The Poisson Process

Lesson 1 (8/28):   The Poisson process
Lesson 2 (8/30):   The distribution of waiting times

2. Aggregate Loss Models. The Compound Poisson Process

Lesson 3 (9/4):   The collective risk model. The Compound model
Lesson 4 (9/6):   Convolutions. The Compound Poisson model
Lesson 5 (9/11):   Calculation of moments
Lesson 6 (9/13):   Normal approximations
Lesson 7 (9/18):   Conditional expectations
Lesson 8 (9/20):   Special cases

3. Coverage modifications

Lesson 9 (9/25):   Regular deductibles
Lesson 10 (9/27)   Stop loss premiums
Lesson 11 (10/2):   Stop loss premiums II
Lesson 12 (10/9):   Policy limits

Lesson 13 (10/11):   The loss elimination ratio
Lesson 14 (10/16):   Inflation
Lesson 15 (10/18):   Applications

4. The mixed Poisson process

Lesson 16 (10/23):   Mixed distributions
Lesson 17 (10/25):   Applications of Bayes theorem

Lesson 18 (10/30):   **Mid-term on first three parts** (50% of grade)
Open book, with SoA calculator. You may have in class: textbooks, your class notes, a few pages with formulas. You may not have in class: ACTEX manuals or any other material. Exam counts for 50% of grade

5. Markov Chains

Lesson 19 (11/1):   Definition of a Markov Chain
Lesson 20 (11/6):   Chapman – Kolmogorov equations
Lesson 21 (11/8):   The stationary distribution
Lesson 22 (11/11):   Examples: Gambler's ruin and credit scoring
Lesson 23 (11/15):   Application to genetics
Lesson 24 (11/20):   Example: Bonus-Malus systems in automobile insurance
Lesson 25 (11/27):   Present value of cash flows in Markov Chains
Lesson 26 (11/29):   Continuous Markov Chains.
Lesson 27 (12/4):   Continuous Markov Chains
Lesson 28 (12/6):   Application to Genetics

Final exam on parts 4 and 5 (50% of grade): Same rules as mid-term.

Solutions to most course pack questions: www.soa.org. Click on Education and Exams, Past Exam and Solutions.

You will need a calculator (TI BA II PLUS or equivalent) for the mid-term and the final. To be fair to all students, a calculator that multiplies matrices is not permitted for the final exam.