



STAT 453/BEPP 453
STAT 853/BEPP 853
ACTUARIAL STATISTICS
Academic Year 2012-2013

Textbook:

Poisson Models:

either Study note from the Society of Actuaries: Daniel: "Poisson processes (and mixture distributions)" (in course pack)
or Ross: Introduction to Probability Models. Any edition, chapter 5.

Aggregate Loss Models:

Klugman, Panjer, Willmot: "Loss Models: From Data to Decisions". John Wiley, second edition, 2004, or third edition, 2008 (bookstore or Lippincott Reserve)

Markov Chains:

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

Course pack: www.study.net.

Office hours:

Tuesdays and Thursdays, 12:30-1:30, Tuesdays 4:30-5:30, and by appointment, SH-DH 3404 (lemaire@wharton.upenn.edu)

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

Syllabus

Poisson Models (Soa Study note or Ross)

- Lesson 1 (9/6): The Poisson process
- Lesson 2 (9/11): The distribution of waiting times
- Lesson 3 (9/13): Thinning. Non-homogeneous Poisson processes
- Lesson 4 (9/18): The Compound Poisson process I
- Lesson 5 (9/20): The Compound Poisson process II
- Lesson 6 (9/25): Mixed Poisson processes
- Lesson 7 (9/27): Conditional distributions

Aggregate Loss Models (Klugman, 2nd edition chapter 6 or 3rd edition chapter 9)

Lesson 8 (10/2): No class
Lesson 9 (10/4): No class
Lesson 10 (10/9): The Compound model
Lesson 11 (10/11): Convolution of two random variables
Lesson 12 (10/16): The moments of aggregate losses
Lesson 13 (10/18): Normal approximations
Lesson 14 (10/25): Normal approximations
Lesson 15 (10/30): Net stop loss premiums
Lesson 16 (11/1): Examples

Markov Chains (SoA Study Note)

Lesson 17 (11/6): Definition of a Markov Chain

Mid-term exam: You can choose November 6 or November 7.

Lesson 18 (11/8): Chapman – Kolmogorov equations
Lesson 19 (11/13): The stationary distribution
Lesson 20 (11/15): Examples: Gambler's ruin and credit scoring
Lesson 21 (11/20): Application to genetics
Lesson 22 (11/27): Example: Bonus-Malus systems in automobile insurance
Lesson 23 (11/29): Present value of cash flows in Markov Chains
Lesson 24 (12/4): Example: Continuing care retirement community
Lesson 25 (12/6): Continuous Markov Chains. Application to Genetics

Mid-term on Poisson Models and Aggregate Loss Models (50% of grade). You must have in class a calculator (SoA or equivalent). You may also have your class notes, the textbook, and a few hand-written pages with formulas.

Final exam on Markov Chains (50% of grade): During exam week, no date yet. Same rules as mid-term.