

STAT 453/BEPP 453/STAT 853/BEPP 853
ACTUARIAL STATISTICS
Academic Year 2014-2015

Reading material:

Poisson Models:

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

Or S. Ross: “Introduction to Probability Models”. 6th or later edition, Academic Press

Aggregate Loss Models:

Klugman, Panjer, Willmot: “Loss Models: From Data to Decisions”. Second, third, or fourth edition, John Wiley (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. Password: INSR2010

Office hours: Tuesdays and Thursdays, 4:30-6:30, 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

Syllabus

Poisson Models

Lesson 1 (8/28):	The Poisson process
Lesson 2 (9/2):	The distribution of waiting times
Lesson 3 (9/4):	Thinning. Non-homogeneous Poisson processes
Lesson 4 (9/9):	No class
Lesson 5 (9/11):	No class
Lesson 6 (9/16):	The Compound Poisson process I
Lesson 7 (9/18):	The Compound Poisson process II
Lesson 8 (9/23):	Mixed Poisson processes
Lesson 9 (9/25):	Mixed Poisson processes
Lesson 10 (9/30):	Applications

Aggregate Loss Models

Lesson 11 (10/2)	The compound model
Lesson 12 (10/7):	Convolution of two random variables

- Lesson 13 (10/14): The moments of aggregate losses
- Lesson 14 (10/16): Normal approximations I
- Lesson 15 (10/21): Normal approximations II
- Lesson 16 (10/23): Net stop loss premiums
- Lesson 17 (10/28): Examples

Markov Chains

- Lesson 18 (10/30): Definition of a Markov Chain
- Lesson 19 (11/4): Chapman – Kolmogorov equations

10/30 or 11/4, 6 pm (Your choice) **Mid-term on Poisson Models and Aggregate Loss Models**
 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

- Lesson 20 (11/6): The stationary distribution
- Lesson 21 (11/11): Examples: Gambler’s ruin and credit scoring
- Lesson 22 (11/13): Application to genetics
- Lesson 23 (11/18): Example: Bonus-Malus systems in automobile insurance
- Lesson 24 (11/20): Present value of cash flows in Markov Chains
- Lesson 25 (11/25): Examples: Continuing care retirement community and Chinese Bonus-Malus System
- Lesson 26 (12/2): Continuous Markov Chains.
- Lesson 27 (12/4): Continuous Markov Chains
- Lesson 28 (12/9): Application to Genetics

Final exam on Markov Chains (50% of grade): Tuesday, December 16, 12:00 – 2:00.
 Same rules as mid-term.

Solutions to most course pack questions: www.soa.org. Click on Education, Exams and Requirements, ASA, Exam MLC or C, Past Exam Questions and Solutions. Find exam session and click Solutions.