Reading material:

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

**Aggregate Loss Models:**

**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](http://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

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