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. Password: INSR2010

Office hours: Tuesdays, 4:30-5:45; Thursdays, 12:30 – 1:30; 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 (8/29): The Poisson process
Lesson 2 (8/31): The distribution of waiting times
Lesson 3 (9/5): Thinning. Non-homogeneous Poisson processes
Lesson 4 (9/7): The Compound Poisson process I
Lesson 5 (9/12): The Compound Poisson process II
Lesson 6 (9/14): Mixed Poisson processes
Lesson 7 (9/19): Mixed Poisson processes
Lesson 8 (9/21): Applications
Lesson 9 (9/26): Applications

Aggregate Loss Models

Lesson 10 (9/28) The compound model
Lesson 11 (10/3): Convolution of two random variables
Lesson 12 (10/10): The moments of aggregate losses
Lesson 13 (10/12): Normal approximations I
Lesson 14 (10/17): Normal approximations II
Lesson 15 (10/19): Net stop loss premiums
Lesson 16 (10/24): Examples

Markov Chains

Lesson 17 (10/26): Definition of a Markov Chain
Lesson 18 (10/31): Chapman – Kolmogorov equations
Lesson 19 (11/2): 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 (11/7): The stationary distribution
Lesson 21 (11/9): Examples: Gambler’s ruin and credit scoring
Lesson 22 (11/14): Application to genetics
Lesson 23 (11/16): Example: Bonus-Malus systems in automobile insurance
Lesson 24 (11/21): Present value of cash flows in Markov Chains
Lesson 25 (11/28): Examples: Continuing care retirement community and Chinese Bonus-Malus System
Lesson 27 (12/5): Continuous Markov Chains
Lesson 28 (12/7): Application to Genetics

Final exam on Markov Chains. Monday December 18, 12:00 – 2:00. (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.