

Syllabus

Course Web Page: <http://rohan.sdsu.edu/~babailey/stat575>
and blackboard.sdsu.edu

Meeting Time: Lectures: MW 2:00 - 3:15 p.m. GMCS 313

Instructor: Professor Barbara Bailey
GMCS 513
email: bbailey@mail.sdsu.edu
Office Hours: M 12:30-1:30 p.m.; by appointment

Reference: The textbook for the course is

Cunningham, R., Herzog, T., and London, R. (2008) *Models for Quantifying Risk*, 3rd Edition. AC-TEX Publications, Inc.

Rotar, V.I. (2006). *Actuarial Models: The Mathematics of Insurance*, CRC Press. (optional)

Objectives: This course will provide you with the basic theory of actuarial models and applications of probability to insurance and other financial risks. The course will analyze the time-to-failure random variable for a single life, and its implications for evaluations of insurance and annuity functions. The theory and application of Markov Chain models are also included.

The Society of Actuaries states that “An actuary is a business professional who analyzes the financial consequences of risk. Actuaries use mathematics, statistics and financial theory to study uncertain future events, especially those of concern to insurance and pension programs. They evaluate the likelihood of those events, design creative ways to reduce the likelihood and decrease the impact of adverse events that actually do occur.” This course is intended to help prepare students for the Exam MLC-Models for Life Contingencies. Details regarding the exam format and exam syllabus can be found off the Society of Actuaries webpage (SOA.org).

Learning Outcomes:

- Produce and interpret graphs for parametric and tabular survival models.
- Calculate and interpret standard probability functions including survival and mortality probabilities, force of mortality, and complete expectation of life.
- Apply to calculations involving tabular or parametric survival models, appropriate approximation methods such as uniform distribution of deaths, constant force, and Balducci.
- Calculate and interpret probabilities, means, percentiles and higher moments on the present value random variables associated with benefits and expenses for different insurance models.
- Calculate and interpret the effect of changes in underlying assumptions such as mortality and interest for different insurance models.
- Use statistical methods to simulate random variables from various distributions and perform Monte Carlo integration with present value random variables.

Homework: Homework assignments will be regularly available on the course web page as announced in class. The homework will contain a series of practice problems of which *selected problems* will be graded or multiple choice questions. The homework serves as a tool to review and practice the material covered in class. All material covered on the assignments can be questioned on the exams. Some problems may require computing and must include concise computer output with a clearly presented version of your code.

Late homework will not be accepted. You may drop your lowest percentage score.

Exams: There will be two in-class exams on Wednesday February 22 and April 12. All exams are closed book. The in-class part of the exam will be closed book. A hand calculator is necessary for all in exams.

Each exam will be worth 100 points. **No makeup exams are given - no exceptions.**

The final exam will be given Monday, May 8 from 1:00 p.m. to 3:00 p.m. in GMCS-313. The final will be cumulative and comprehensive.

Grading: The grade for the class is based on a score composed of the following.

Homework	20 %
Two Exams	50 %
Final Exam	30 %

Topics to be covered: basic outline; topics may be added and/or dropped as the semester proceeds.

1. Review of Probability
 - a. Random Variables and Their Distributions
 - b. Survey of Discrete and Continuous Distributions
 - c. Multivariate Probability
 - d. Sums of Independent Random Variables
2. Survival Models
 - a. Age-at-Failure Random Variables
 - b. Parametric Survival Models
 - c. Time-to-Failure Random Variables
3. The Life Table
 - a. Traditional Form of the Life Table
 - b. Derived Form of the Life Table
4. Life Insurance Models
 - a. Discrete Stochastic Models
 - b. Continuous Stochastic Models
5. Life Annuity Models
6. Markov Chains

Prerequisites: STAT 550 or 551A

Tardiness and Early exits: The class time is from 2:00 - 3:15 p.m. As common courtesy to your fellow students, we would appreciate if you show up to class on time and leave when dismissed at 3:15. If you must leave early, please inform me and sit on the aisle near an exit so as not to disturb students listening to and trying to learn from the lectures.

Code of Academic Conduct on Examinations and Assignments: “At San Diego State University, students are invited to be active members of the educational community. As with any community, its members serve a vital role in determining acceptable standards of conduct, which includes academic conduct that reflects the highest level of honesty and integrity.” The “Statement of Student Rights and Responsibilities clarifies for students their role as members of the campus community, setting forth what is expected of them in terms of behavior and contributions to the success of our university.” “Inappropriate conduct by Students . . . is subject to discipline on all San Diego State University Campuses. The Center for Student Rights and Responsibilities coordinates the discipline process and establishes standards and procedures in accordance with regulations contained in Sections 41301-41304 of Title 5 of The California Code of Regulations, and procedures contained in Executive Order 628, Student Disciplinary Procedures for The California State University.” See <http://www.sa.sdsu.edu/srr/judicial> for more information.

Students with Disabilities: If you are a student with a disability and believe you will need accommodations for this class, it is your responsibility to contact Student Disability Services at (619) 594-6473. To avoid any delay in the receipt of your accommodations, you should contact Student Disability Services as soon as possible. Please note that accommodations are not retroactive, and that accommodations based upon disability cannot be provided until you have presented your instructor with an accommodation letter from Student Disability Services. Your cooperation is appreciated.

Other information: See course web page: <http://rohan.sdsu.edu/~babailey/stat575>