Math 419A Actuarial Mathematics I Fall 2008

MWF 12:00 – 12:50 Bouillon 215

Instructor: Cen-Tsong Lin

Office: Bouillon 108B, Tel: 963-2842, e-mail: ctl@cwu.edu

Office Hours: 10 – 10:50, Monday – Friday or by appointment

Prerequisite: Math411A

Course goals: The goal of this course is to develop students' knowledge of the theoretical basis of certain actuarial models and the application of those models to insurance and other financial risks. After completing this sequence (Math 419A/B/C), students will be able to apply their knowledge to price and evaluate the risk for traditional insurance and annuities products. After completing Math 419A, students will be able to calculate and demonstrate mortality rates, survival time, and benefit premiums for traditional insurance and annuity products.

Required Text: Cunningham, R., Herzog, T. and London, R.L., *Models for Quantifying Risk*, Second Edition, ACTEX Publications, Inc., 2006
Optional reference: Bowers, Gerber, Hickman, Jones and Nesbitt, *Actuarial Mathematics*, 2nd edition, Society of Actuaries, 1997.

Course outlines:

Chapter 3 Survival Models (continuous parametric context)

The age-at-death random variable X
- The cumulative distribution function of X
- The survival distribution function of X
- The hazard rate function of X
- The moments of X

Examples of parametric survival models
- The uniform distribution
- The exponential distribution
- The Gompertz distribution
- The Makeham distribution
- The Weibull distribution

The time-to-death random variable for a person age x (T_x)
- The cumulative distribution function of T_x
- The survival distribution function of T_x
- The hazard rate function of T_x
- The moments of T_x
- The discrete time-to-death random variable K_x
- The central rate of death for a person age x (m_x)
- Select survival models

Chapter 4 The life table (discrete tabular context)

The traditional form of the life table
Other functions derived from a life table (l_x)
- Force of mortality
- The pdf of X
- Conditional probabilities and densities of X
- The curtate expectation of life at age x (e_x)
- The central rate of death

Methods for non-integral ages
- Linear form
- Exponential form
- Hyperbolic form

Select life tables

Chapter 5 Contingent payment models (Insurance models)

Discrete stochastic models
Group deterministic approach
Continuous stochastic models
Contingent payment models with varying payments
Continuous and m^{thly} contingent payment models

Chapter 6 Contingent annuity models (Life annuities)

Whole life annuity models
Temporary annuity models
Deferred whole life annuity models
Contingent annuities payable m^{thly}
Non-level payment annuity functions

Grading Policy

Two tests: Fri, 10/17/2008 and Mon, 11/10/2008	40%
Homework assignments	30%
Final exam 12:00 – 2:00, Tuesday, 12/09/2008 (Comprehensive)	30%
Total	100%

Homework will be assigned daily throughout the quarter and due one week after it is assigned