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OFFICIAL SYLLABUS
STAT 486A – ACTUARIAL MATHEMATICS
(Adopted Spring 2013)

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Catalog Description: Utility theory, risk models, survival distributions, life tables. Life insurance models, life annuities, premium calculation, valuation theory for pension plans. Prerequisite: Math 340 and either Stat 380 or 480a.

Textbook: Models for Quantifying Risk, 5th edition, by Cunningham, R. J., Herzog, T. N., and London, R. L.

Course Outline and Topics

Chapter 3 – Review of Markov Chains
       3.1 Discrete-Time Markov Chains   3.3 Payments
       3.2 Continuous-Time Markov Chains

Chapter 5 – Survival Models (Continuous Parametric Context)
       5.1 The Age-at-Failure Random Variable   5.4 Select Survival Models
       5.2 Examples of Parametric Survival Models   5.5 Multi-State Model Interpretation
       5.3 The Time-to-Failure Random Variable

Chapter 6 – The Life Table (Discrete Tabular Context)
       6. 1 Definition of the Life Table   6.5 Multi-State Model Interpretation
       6.2 The Traditional Form of the Life Table   6.6 Methods for Non-Integral Ages
       6.3 Other Functions Derived from l_x 6.7 Select Life Tables
       6.4 Summary of Concepts and Notation

Chapter 7 – Contingent Payment Models (Insurance Models)
       7.1 Discrete Stochastic Models   7.5 Continuous & m^{thly} Functions
       7.2 Group Deterministic Approach   Approximated from the Life Table
       7.3 Continuous Stochastic Models   7.6 Multi-State Model Representation
       7.4 Contingent Payment Models with   7.7 Miscellaneous Examples
         Varying Payments

Chapter 8 – Contingent Annuity Models (Life Annuities)
       8.1 Whole Life Annuity Models   8.5 Non-Level Payment Ann. Functions
       8.2 Temporary Annuity Models   8.6 Multi-State Model Representation
       8.3 Deferred Whole Life Annuity Models   8.7 Miscellaneous Examples
       8.4 Contingent Annuities Payable m^{thly}

Chapter 9 – Funding Plans for Contingent Contracts (Annual Premiums)
       9.1 Annual Funding Schemes for Contingent 9.4 Continuous Payment Funding
         Payment Models   Schemes
       9.2 Random Variable Analysis   9.5 Funding Schemes with m^{thly}
       9.3 The Percentile Premium Principle   Payments

Chapter 10 – Contingent Contract Reserves (Net Level Premium Benefit Reserves)
       10.1 NLP Res for Contingent Payment Models 10.4 NLP Res for Contingent Payment
         With Annual Payment Funding   Models with m^{thly} Payment Funding
       10.2 Recursive Rel. for Discrete Models with 10.5 Multi-State Model Representation
         Annual Premiums
       10.3 NLP Res for Contingent Payment Models
         With Continuous Payment Funding

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Any instructor should cover all of the material specified, additional sections are optional.

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