

ESSENTIAL READINGS

- Feller, W. (1968). Introduction to probability Theory and Its Applications, Vol I, 3rd Ed., Wiley International.
- Medhi, J. (2019). Stochastic Processes, 4th Ed., Reprint, New Age International Publishers.

SUGGESTIVE READINGS:

- Sheldon M. Ross (2007) : Introduction to Probability Models, 9th edition, Academic Press publications
- Karlin & Taylor (1975) : A first course in stochastic processes, 2nd edition, Academic Press publications
- Basu, A.K. (2005). Introduction to Stochastic Processes, Narosa Publishing.
- P. G. Hoel, S. C. Port and C. J. Stone: Introduction to Stochastic Processes.
- J. G. Kemeny, J. L. Snell and A. W. Knapp: Finite Markov Chains.
- Geoffrey R, Grimmett & David R. Stirzaker : Probability and Random Processes
- Bhat, B.R. (2000). Stochastic Models: Analysis and Applications, New Age International Publishers.

Note: Examination scheme and mode shall be as prescribed by the Examination Branch University of Delhi, from time to time.

Discipline Specific Elective for B. Sc. (H) Statistics

DISCIPLINE SPECIFIC ELECTIVE COURSE – 3A: ACTUARIAL STATISTICS

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)
		Lecture	Tutorial	Practical/ Practice		
Actuarial Statistics	4	3	0	1	Class XII pass with Mathematics	----

Learning Objectives

The learning objectives include:

- To learn basics of Actuarial Science.
- To learn advanced techniques in Actuarial Science with practical applications in daily life.

Learning Outcomes:

After completing this course, students should have developed a clear understanding of:

- Basics of Actuarial Science.

- Tools for applying actuarial methods in phenomena for financial research and insurance.
- Computation of premiums and settlement of claims

SYLLABUS OF DSE-3A

Theory

UNIT I

(9 Hours)

Introductory Statistics and Insurance Applications

Introductory Statistics and Insurance Applications: Discrete, continuous and mixed probability distributions. Insurance applications, sum of random variables. Utility theory: Utility functions, expected utility criterion, types of utility function, insurance and utility theory.

UNIT II

(12 Hours)

Principles of Premium Calculation

Principles of Premium Calculation: Properties of premium principles, examples of premium principles. Individual risk models: models for individual claims, the sum of independent claims, approximations and their applications.

UNIT III

(6 Hours)

Survival Distribution and Life Tables:

Survival Distribution and Life Tables: Uncertainty of age at death, survival function, time-until-death for a person, curate future lifetime, force of mortality, life tables with examples, deterministic survivorship group, life table characteristics

UNIT IV

(15 Hours)

Life Insurance

Life Insurance: Models for insurance payable at the moment of death, insurance payable at the end of the year of death and their relationships. Life annuities: continuous life annuities, discrete life annuities. Premiums: continuous and discrete premiums.

PRACTICAL/LAB WORK – (30 hours)

List of Practical:

1. Risk computation for different utility models.
2. Discrete and continuous risk calculations.
3. Calculation of aggregate claims for collective risks.
4. Calculation of aggregate claim for individual risks.
5. Computing Ruin probabilities and aggregate losses.
6. Annuity and present value of contract.
7. Computing premium for different insurance schemes.
8. Practical based on life models and tables.

Practical work to be conducted using electronic spreadsheet / EXCEL/ Statistical Software Package/ SPSS/ calculators.

ESSENTIAL READINGS

- Dickson, C. M. D. (2005): Insurance Risk And Ruin (International Series On Actuarial Science), Cambridge University Press. Bowers, N. L., Gerber, H. U., Hickman,
- Atkinson, M.E. and Dickson, D.C.M. (2011): An Introduction to Actuarial Studies, Elgar Publishing.