

## Discipline Specific Elective Category-V

### **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	<b>NIL</b>

#### **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 will develop 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.

### **SUGGESTIVE READINGS**

- J. C., Jones, D. A. And Nesbitt, C. J. (1997): .Actuarial Mathematics, Society Of Actuaries, Itasca, Illinois, U.S.A.

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

### **DISCIPLINE SPECIFIC ELECTIVE COURSE– 3B: SIMULATION TECHNIQUES IN STATISTICS (Not for category II)**

#### **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		
Simulation Techniques in Statistics	4	3	0	1	Class XII pass with Mathematics	knowledge of basic statistics