CONCEPT

Actuarial Science Fundamentals: Life Tables, Premium Pricing and Claims Reserving

28 June – 2 July 2027
Paris - Right Bank business hotel



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Introduction:

Insurance and finance teams rely on actuarial figures for premiums, reserves and capital, yet many of the people who use or approve those figures cannot test the assumptions behind them. Misread mortality tables, reserve estimates or pricing loadings lead to underpriced products, reserve surprises and weaker solvency positions. This Core Concept Actuarial Science Fundamentals course equips non-actuaries to work with probability, the time value of money, life tables, premium principles, claims reserving and reinsurance, and to question actuarial reports with evidence. Participants build an Actuarial Fundamentals Workbook and Report Review Checklist in spreadsheets.

Course Objectives:

- Explain the role of the actuary, the actuarial control cycle and risk pooling, and identify where actuarial outputs drive decisions in their own organisation
- Apply claim frequency and severity distributions, expected values and variance to summarise insurance claims experience
- Calculate present values of cash flows and annuity payment streams using interest and discount factors in a spreadsheet
- Use a life table to derive mortality rates, life annuity values and net premiums under the equivalence principle, and add gross premium loadings
- Estimate outstanding claims and IBNR reserves with the chain ladder method at concept level and describe how reinsurance and capital requirements affect an insurer
- Review an actuarial report for assumptions, methods, sensitivities and limitations and record the questions to raise with the actuary

Target Audience:

- Underwriting and pricing staff who apply rates and loadings produced by actuaries
- Claims staff who set case reserves and supply the data used in reserving
- Finance and accounting staff who book technical reserves and report insurance results
- Internal audit and risk staff who test actuarial processes and assumptions
- Reinsurance and product development staff who work with actuarial pricing and treaty analysis
- Pension and employee benefit administrators who handle annuity and mortality calculations

Course Outline:

Day 1: Role of the Actuary and Insurance Risk Foundations

- Role of the Actuary Across Life, General and Health Insurance and Pensions
- Actuarial Control Cycle: Define the Problem, Design the Solution, Monitor Experience
- Risk Pooling and the Law of Large Numbers in Insurance Portfolios
- Claims Data Fields, Exposure Units and Earned Exposure Measures
- Actuarial Output Map: Reports, Users and Decisions in Your Organisation

Day 2: Probability, Statistics and Financial Mathematics for Insurance

- Claim Count Distributions: Poisson and Binomial Models
- Claim Severity Distributions: Lognormal and Pareto Tail Behaviour
- Expected Value, Variance and Confidence Intervals for Claims Experience
- Compound Interest, Discount Factors and Present Value Spreadsheet Build
- Annuity-Certain Valuation: Immediate, Due and Deferred Payment Streams

Day 3: Life Tables, Mortality and Premium Calculation

- Life Table Construction: lx, dx, qx and Life Expectancy
- Mortality Rates, Selection Effects and Mortality Improvement Assumptions
- Life Annuity and Life Assurance Present Values from a Life Table
- Equivalence Principle Net Premium Calculation for Term and Endowment Cover
- Gross Premium Loadings: Expenses, Commission, Profit and Risk Margin

Day 4: Claims Reserving, Reinsurance and Solvency Concepts

- Case Reserves, Outstanding Claims Reserves and Incurred But Not Reported IBNR
- Claims Development Triangles and Chain Ladder Development Factors
- Expected Loss Ratio and Bornhuetter-Ferguson Method at Concept Level
- Quota Share, Surplus and Excess of Loss Reinsurance Structures
- Risk-Based Capital, Solvency Margin and Stress Scenario Concepts

Day 5: Modelling Build: Actuarial Fundamentals Workbook and Report Review

- Motor Portfolio Case: Frequency-Severity Pricing Worksheet
- Group Life Case: Life Table Premium and Policy Reserve Worksheet
- Property Claims Case: Chain Ladder IBNR Estimate and Sensitivity Test
- Actuarial Report Reading: Assumptions, Methods, Limitations and Sign-Off
- Actuarial Fundamentals Workbook and Report Review Checklist Presentation

Skills You Will Gain:

- Actuarial Terminology Fluency
- Claims Frequency and Severity Analysis
- Present Value and Annuity Calculation
- Life Table Interpretation
- Net and Gross Premium Calculation
- Chain Ladder Reserve Estimation
- Reinsurance Structure Comparison
- Actuarial Assumption Challenge

Why Attend This Course:

- Leave with an Actuarial Fundamentals Workbook of pricing, life table and reserving worksheets that can be reused on your own data
- Understand the numbers behind premiums, reserves and reinsurance well enough to ask actuaries the right questions
- Practise every calculation in spreadsheets with step-by-step cases from motor, group life and property portfolios
- Take back a Report Review Checklist for testing the assumptions and limitations in any actuarial report you receive

Conclusion:

Actuarial work shapes the premiums an insurer charges, the reserves it holds and the capital it needs, so everyone who uses those figures benefits from understanding how they are built. This course moves from the role of the actuary and risk pooling, through probability and financial mathematics, to life tables, premium calculation, claims reserving, reinsurance and solvency concepts. The final day applies these methods to motor, group life and property cases and produces an Actuarial Fundamentals Workbook and Report Review Checklist for use at work.