

**Subject ST3
General Insurance
Specialist Technical**

Syllabus

for the 2009 Examinations

1 June 2008

**The Faculty of Actuaries and
Institute of Actuaries**

Subject ST3 — General Insurance Specialist Technical Syllabus

Aim

The aim of the General Insurance Specialist Technical subject is to instil in successful candidates the ability to apply, in simple situations, the mathematical and economic techniques and the principles of actuarial planning and control needed for the operation on sound financial lines of general insurers.

Links to other subjects

Subject CT3 — Probability and Mathematical Statistics: provides a basic grounding in statistics

Subject CT4 — Models: covers some stochastic models used in general insurance.

Subject CT6 — Statistical Methods: covers some of the mathematical methods relevant for general insurance.

Subject CA1 — Core Application Concepts: covers the general underlying principles affecting all specialisms.

Subject SA3 — General Insurance Specialist Applications: will use the principles of general insurance developed in this subject to develop a deeper understanding of general insurance business and United Kingdom practice.

Objectives

On completion of this subject the candidate will be able to:

- (a) Define the principal terms in use in general insurance.
- (b)
 - (i) Describe the main types of general insurance product in terms of:
 - the needs of customers
 - the financial and other risks they pose for the general insurer including their capital requirements and possible effect on solvency
 - (ii) Describe the main types of general reinsurance products and the purposes for which they may be used.

- (c) Describe the implications of the general business environment in terms of:
- the main features of the general insurance market
 - the effect of different marketing strategies
 - the effect of the regulatory and fiscal regimes
 - the general effect of professional guidance
- (d) Calculate the adjustment coefficient and state Lundberg's inequality. Describe the effect on the probability of ruin of changing parameter values and of simple reinsurance arrangements.
- (i) Define a Poisson process, derive the distribution of the number of events in a given time interval, derive the distribution of inter-event times, and apply these results.
- (ii) Define a compound Poisson process and derive the moments and moment generating function for such a process.
- (iii) Define the adjustment coefficient for a compound Poisson process and for discrete time processes which are not compound Poisson, calculate it in simple cases and derive an approximation.
- (iv) State Lundberg's inequality and explain the significance of the adjustment coefficient.
- (v) Describe the effect on the probability of ruin, in both finite and infinite time, of changing parameter values.
- (vi) Analyse the effect on the adjustment coefficient and hence on the probability of ruin of simple reinsurance arrangements.
- (e) Describe the major areas of risk and uncertainty in general insurance business, in particular those that might threaten profitability or solvency.
- (f) Describe the importance of data quality in the assessment of risks and identify checks that might be used.
- (g) Outline the major actuarial investigations undertaken for general insurers.
- (h) (i) Describe the basic methodology used in rating general insurance business.
- (ii) Develop appropriate rating bases for general insurance contracts, having regard to:
- return on capital
 - underwriting considerations
 - reinsurance considerations
 - investment

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- policy conditions such as self retention limits
 - the renewal process
 - expenses
- (i) Describe and apply the fundamental concepts of the empirical approach to credibility theory.
- (i) Explain the empirical Bayes approach to credibility theory, in particular its similarities with and its differences from the Bayesian approach.
- (ii) Use the empirical Bayes approach to derive credibility premium formulae for the two standard elementary models of empirical Bayes credibility theory, one incorporating and one not incorporating risk volumes. (Models 1 and 2 in the Formulae and Tables for Actuarial Examinations.)
- (iii) State the assumptions underlying the two models in (i) (ii).
- (iv) Calculate credibility premiums for the two models in (i) (ii).
- (j) Calculate and approximate the aggregate claim distribution for short term insurance contracts.
- (i) State a recursion formula for calculating the aggregate claim distribution in cases where claim amounts are distributed on the positive integers and claim numbers have a binomial, a Poisson or a negative binomial distribution.
- (ii) Approximate the aggregate claim distribution by a normal distribution fitted by moments.
- (iii) Approximate the aggregate claim distribution by a translated gamma distribution fitted by moments.
- (k) (i) Describe the basic methodology used in reserving for general insurance business.
- (ii) Develop appropriate reserving bases for general insurance business, having regard to:
- the different reasons for calculating reserves
 - the assumptions that might be appropriate in each case
 - the reasons why the assumptions may differ from those used in rating
 - the reasons for selecting different methodologies, with particular reference to the timing of the run-off of reserves
 - the allowance for future inflation
 - whether or not to discount for investment income
 - the likely sources of uncertainty

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- (l) Develop appropriate reinsurance programme structures for a general insurer.
- (m) Develop appropriate models for the purpose of financial planning to enable a general insurer to develop and monitor its strategic objectives at either the corporate or product level.
- (n) Describe the principles of investment and the asset liability matching requirements of a general insurer and outline how projection models might be used to develop an appropriate investment strategy.
- (o) Describe the methods and principles of accounting for general insurance business and interpret the accounts of a general insurer.
- (p) With reference to the Actuarial Control Cycle explain why the actual experience of a general insurer should be monitored and analysed, describe how this is done in terms of:
 - claims and exposure
 - portfolio movements
 - expenses
 - persistency and profitability by source

and apply the methodology to practical problems relating to:

- rating
- reserving
- reinsurance programme performance
- financial planning
- monitoring the asset / liability position

End of Syllabus