



Subject F103

General Insurance Principles

Fellowship Principles Syllabus

For the 2023 Examinations

October 2021



Aim

The aim of this General Insurance Specialist Technical subject is to instil in successful candidates the ability to apply, in simple reserving, capital modelling and pricing 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.

The objectives have been split into three main sections, namely:

- General principles
- Reserving and Capital Modelling
- Pricing

Links to other subjects

Subject A111 (CS1) — Actuarial Statistics: provides a basic grounding in statistics

Subject A212 (CS2)— Risk Modelling and Survival Analysis: covers some stochastic models used in general insurance.

Subject A311 — Actuarial Risk Management: covers the general underlying principles affecting all specialisms.

Subject F203 — General Insurance Fellowship Applications: will use the principles of general insurance developed in this subject to develop a deeper understanding of general insurance business and South African practice.

Additional Reading

Statistical and Probabilistic Methods in Actuarial Science by Philip J. Boland (University College Dublin).

Objectives

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

General Principles

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



- d) Describe the implications of the general business environment in terms of:
 - i) the main features of the general insurance market
 - ii) the effect of different marketing strategies
 - iii) the effect of fiscal regimes
 - iv) the effect of inflation and economic factors
 - v) the effect of legal, political and social factors
 - vi) the effect of the climate and environmental factors
 - vii) the general effect of professional guidance
- e) Outline the key features of the Lloyd's market.
- f) Describe the major areas of risk and uncertainty in general insurance business with respect to reserving, capital modelling and pricing, in particular those that might threaten profitability or solvency.
- g) With regard to the use of data in reserving, capital modelling and pricing:
 - i) describe the types of data that are used
 - ii) describe the main uses of data
 - iii) describe the requirements for a good information system
 - iv) outline the possible causes of data errors
 - v) identify checks that might be used
 - vi) understand the effects of inadequate data
- h) Outline the major actuarial investigations and analyses of experience undertaken with regard to reserving, capital modelling and pricing for general insurers.

Reserving and Capital Modelling

- a) With regard to reserving work using triangulations:
 - i) Understand the range of general issues that can affect reserving work using triangulations.
 - ii) Gain an appreciation of how to deal with these general issues in reserving work.
 - iii) Have an understanding of the main triangulation methods in use — namely the chain ladder method, the Bornhuetter-Ferguson method and the Average Cost per Claim method.
- b) Develop appropriate reserving bases for general insurance business, having regard to:
 - i) the different reasons for calculating reserves
 - ii) the assumptions that might be appropriate in each case



- iii) the allowance for future inflation
 - iv) whether or not to discount for investment income
 - v) the likely sources of uncertainty
 - vi) communication of the reserving basis
- c)
- i) Describe the uses of stochastic reserving methods.
 - ii) Describe the following types of stochastic reserving methods:
 - (1) analytic methods
 - (2) simulation-based methods
 - iii) Describe the Bootstrapping approach to reserving, and the various approaches that may be followed.
 - iv) Describe the issues, advantages and disadvantages of each of the methods.
 - v) Describe the approach to aggregating the results of stochastic reserving across multiple lines of business, and discuss methods of correlation.
- d)
- i) Describe the factors an actuary should consider in assessing the reasonableness of the results of a reserving exercise.
 - ii) Describe typical diagnostics that are commonly used to assess the reasonableness of the results of a reserving exercise.
 - iii) Describe the factors an actuary should consider in assessing the reasonableness of changes in results of a reserving exercise over time.
 - iv) Describe how an analysis of experience might be carried out in the context of a reserving exercise.
 - v) Describe how alternative results of reserving exercises can arise and highlight some of the professional issues in resolving them.
- e)
- i) Understand what is meant by a “best estimate” reserve.
 - ii) Describe the following approaches to estimating ranges of reserves:
 - (1) stochastic models
 - (2) scenario tests
 - (3) use of alternative sets of assumptions
 - iii) Discuss the uses and issues with each of these methods.
 - iv) Discuss the issues to be considered when communicating reserve ranges and uncertainties.
- f) Describe:
- i) the principles of investment
 - ii) the asset-liability matching requirements of a general insurer
 - iii) how projection models might be used to develop an appropriate investment strategy
- g)
- i) Understand the following considerations in deriving and applying capital modelling



techniques:

- (1) business plans
- (2) risk registers
- (3) model requirements

ii) Understand the following approaches to capital modelling:

- (1) deterministic models
- (2) stochastic models
- (3) aggregation methodologies
- (4) correlations within models

iii) Discuss the following issues with regard to parameterisation of capital models:

- (1) developing assumptions
- (2) validation and back-testing
- (3) sensitivity testing

h) Describe approaches to the assessment of capital requirements for the following risk types:

- i) insurance risk
- ii) market risk
- iii) credit risk
- iv) operational risk
- v) liquidity risk
- vi) group risk

i)

- i) Understand the importance of diversification, and develop appropriate assumptions for capital modelling of diversification between risks.
- ii) Demonstrate an understanding of how actuarial judgement may apply to capital modelling.
- iii) Explain some of the areas to consider when approaching a capital modelling exercise.

j) Describe how the principles of practicability and proportionality apply to capital modelling and explain what guidance exists.

k)

- i) Describe how to develop an appropriate reinsurance programme for a general insurer.
- ii) Describe how to test the appropriateness of alternative reinsurance structures for a general insurer.
- iii) Describe how reinsurance purchasing decisions might be impacted by capital management considerations.

l)

- i) Describe the following approaches to reserving for outwards reinsurance:
 - (1) gross less net



- (2) application of standard techniques to reinsurance data
 - (3) use of appropriate factors
 - (4) application of detailed contract terms
 - ii) Understand the advantages and disadvantages of each of the above methods and the appropriate circumstances in which to use them.
- m) Describe the methods and principles of accounting for general insurance business and interpret the accounts of a general insurer.
- n)
- i) Discuss the purposes of regulating general insurance business.
 - ii) Outline possible methods by which general insurers can be regulated, including advantages and drawbacks of each.

Pricing

- a)
- i) Understand the various components of a general insurance premium.
 - ii) Describe the basic methodology used in rating general insurance business.
 - iii) Appreciate the various factors to consider when setting rates.
- b) Develop appropriate rating bases for general insurance contracts, having regard to:
- i) return on capital
 - ii) underwriting considerations
 - iii) reinsurance considerations
 - iv) investment
 - v) policy conditions such as self-retention limits
 - vi) the renewal process
 - vii) expenses
- c)
- i) Describe the burning cost approach to rating.
 - ii) Understand the assumptions required when using this approach.
 - iii) Outline the practical considerations when using this approach.
- d)
- i) Describe the frequency / severity approach to rating.
 - ii) Understand the assumptions required when using this approach.
 - iii) Outline the practical considerations when using this approach.
- e)
- i) Describe how Original Loss Curves can be used in rating.
 - ii) Understand the assumptions required when using this approach.
 - iii) Outline the practical considerations when using this approach.
- f) Understand the applications of Generalised Linear Models to the rating of personal lines business and small commercial risks.



- g)
 - i) Understand the uses of multivariate models in pricing.
 - ii) Outline the different types of multivariate models.
- h) Describe the practical uses of credibility models in a general insurance environment.
 - i)
 - i) Outline the similarities and differences between pricing direct and reinsurance business.
 - ii) Describe how to determine appropriate premiums for each of the following types of reinsurance:
 - (1) proportional reinsurance
 - (2) non-proportional reinsurance
 - (3) property catastrophe reinsurance
 - (4) stop losses
 - iii) Describe the data required to determine appropriate premiums for each of the above types of reinsurance.
 - j)
 - i) Outline the basic structure of a catastrophe model.
 - ii) Describe the key perils that can be modelled.

End of Syllabus