



Subject A311

Actuarial Risk Management

Core Principles Syllabus

For the 2022 Examinations

October 2021

Aim

The aim of the Actuarial Risk Management subject is to use the technical and business skills learnt in the Actuarial Statistics, Actuarial Modelling and Business subjects combining them with new material on how the skills are applied to solve real world problems.

The course provides the essential knowledge of risk management techniques and processes required by all actuaries and is an essential introduction to Enterprise Risk Management, Subject F106 and the Chartered Enterprise Risk Actuary qualification.

The course also underpins the F100 (Fellowship Principles) and F200 (Fellowship Application) subjects, covering essential background material that is common to a number of specialisms.

Competencies

On successful completion of this subject, a student will be able to:

- 1 understand strategic concepts in the management of financial institutions and products;
- 2 understand the risks faced both by individuals and groups who might effect financial products and also by the providers of such products;
- 3 explain the principles and techniques used to manage these risks;
- 4 understand the key techniques used by the providers of financial products to ensure that promised liabilities can be met; and
- 5 apply this knowledge, together with the skills learned from other subjects, to analyse the issues and formulate, justify, and present plausible solutions to business problems.

Links to other subjects

Each of Subjects A111, A112, A113, A211, A212, A213 and A214 provides principles and tools that are built upon in Actuarial Risk Management

The Fellowship Principles (F101 – F106) and the Fellowship Application (F201 – F206) use the concepts developed in this subject to solve more complex problems, to produce coherent advice, and to make recommendations in specific practice areas.

Syllabus Topics

Note: In this syllabus the phrase 'financial products' is used to encompass all types of financial product, scheme, contract or other arrangements.

Topic	Weighting
1 Actuarial advice	2.5%
2 Meeting the needs of stakeholders	2.5%
3 The actuarial control cycle	2.5%
4 Risk Governance	5%
5 Risk identification and classification	5%
6 Risk measurement and monitoring	5%
7 Responses to risk	7.5%
8 Capital management and monitoring	5%
9 The general business environment	20%
10 Specifying the problem	5%
11 Producing the solution	30%
12 Living with the solution	7.5%
13 Monitoring	2.5%
14 Principal terms	nil

The weightings above are indicative of the approximate balance of the assessment of this subject between the main syllabus topics, averaged over a number of examination sessions.

The weightings also correspond with the amount of learning material underlying each syllabus topic. However, this will also reflect aspects such as:

- the relative complexity of each topic, and hence the amount of explanation and support required for it;
- the need to provide thorough foundation understanding on which to build the other objectives;
- the extent of prior knowledge which is expected; and
- the degree to which each topic area is more knowledge or application based.

Skill Levels

The use of a specific command verb within a syllabus objective does not indicate that this is the only form of question which can be asked on the topic covered by that objective. The Examiners may ask a question on any syllabus topic using any of the command verbs defined in the document 'Command verbs used in the Associate and Fellowship written examinations'

Questions may be set at any skill level: Knowledge (demonstration of a detailed knowledge and understanding of the topic), Application (demonstration of an ability to apply the principles underlying the topic within a given context) and Higher Order (demonstration of an ability to perform deeper analysis and assessment of situations, including forming judgements, taking into account different points of view, comparing and contrasting situations, suggesting possible solutions and actions and making recommendations).

In the A311 subject, the approximate split of assessment across these three skill types is 20% Knowledge, 50% Application and 30% Higher Order Skills.

Detailed Syllabus Objectives

1 Actuarial advice

- 1.1 Identify the clients that actuaries advise in both the public and private sectors and the stakeholders affected by that advice.
- 1.2 Describe how stakeholders other than the client might be affected by any actuarial advice given.
- 1.3 Describe the functions of the clients that actuaries advise and the types of advice that actuaries might give to their clients.
- 1.4 Explain why and how certain factual information about the client should be sought in order to be able to give advice.
- 1.5 Explain why subjective attitudes of clients and other stakeholders – especially towards risk – are relevant to giving advice.
- 1.6 Distinguish between the responsibility for giving advice and the responsibility for taking decisions.
- 1.7 Discuss the professional and technical standards that might apply to actuarial advice.

2 Meeting the needs of stakeholders

- 2.1 Describe the main providers of benefits on contingent events.
- 2.2 Describe the main types of social security benefits and financial products and explain how they can provide benefits on contingent events which meet the needs of clients and stakeholders.
- 2.3 Explain the main principles of insurance and pensions that impact on these benefits and products.
- 2.4 Describe the ways of analysing the needs of clients and stakeholders to determine the appropriate benefits on contingent events to be provided by financial products.

3 The Actuarial Control Cycle

- 3.1 Describe the Actuarial Control Cycle and explain the purpose of each of its components.
- 3.2 Demonstrate how the Actuarial Control Cycle can be applied in a variety of practical commercial situations, including its use as a Risk Management Control Cycle.

4 Risk Governance

- 4.1 Describe the risk management process for a business that can aid in the design of financial products.
- 4.2 Discuss the differences between risk and uncertainty and between systematic and diversifiable risk.
- 4.3 Describe how enterprise risk management can add value to the management of a business.
- 4.4.1 Discuss the roles and responsibilities of various stakeholders in the management of risk.
- 4.4.2 Evaluate the elements and structure of a successful risk management function.
- 4.5 Discuss risk appetite and the attainment of risk efficiency.

5 Risk identification and classification

- 5.1 Describe the techniques that can be used to identify the risks associated with financial products or with the providers of benefits on contingent events.
- 5.2 Discuss how the risks of a project are taken into account in project management.
- 5.3 Describe the risks and uncertainties affecting:
 - the level and incidence of benefits payable on contingent events
 - the overall security of benefits payable on contingent events.
- 5.4 Describe how risk classification can aid the design of financial products that provide benefits on contingent events.
- 5.5 Show an awareness and understanding of the risk categories that apply to businesses in general, and particularly financial services businesses.

6 Risk measurement and monitoring

- 6.1.1 Describe the various methods used to quantify risk.
- 6.1.2 Demonstrate the properties of risk measures (e.g. VaR and TVaR) and their limitations.
- 6.2 Discuss the uses of scenario analysis, stress testing and stochastic modelling in the evaluation of risk.
- 6.3 Describe different methods of risk aggregation and explain their relative advantages and disadvantages.
- 6.4 Explain the importance of risk reporting to managers and other stakeholders.
- 6.5 Discuss the methods of measuring and reporting risk that can be used by the main providers of financial products.

7 Responses to risk

- 7.1 Describe attitudes to and methods of risk acceptance, rejection, transfer and management for stakeholders.
- 7.2 Distinguish between the risks taken as an opportunity for profit and the risks to be mitigated.

- 7.3 Describe the principle of pooling risks.
- 7.4 Describe the methods of transferring risks.
- 7.5 Analyse the risk management aspects of a particular business issue and recommend an appropriate risk management strategy.
- 7.6 Describe the tools that can be used to aid the management and control of risk.
- 7.7 Discuss the issues surrounding the management of risk for financial product providers.
- 7.8 Describe how risks with low likelihood but high impact might be managed.

8 Capital management and monitoring

- 8.1 Discuss the interrelationship between risk and capital management.
- 8.2 Explain the implication of risk for capital requirement, including economic and regulatory capital requirements.
- 8.3 Describe how the main providers of financial products can meet, manage and match their capital requirements.
- 8.4 Discuss the implications of the regulatory environment in which the business is written for provisioning and capital requirements.
- 8.5 Discuss risk-based capital and compare with other measures of capital needs.
- 8.6 Discuss the merits of looking at an economic balance sheet in order to determine the risk-based capital requirements of a provider financial products.
- 8.7 Discuss the use of internal models for assessment of economic and regulatory capital requirements.
- 8.8 Demonstrate how to use risk measures and capital assessment.
- 8.9 Propose techniques of allocating capital to business units in order to gauge performance.

- 8.10 Demonstrate a conceptual understanding of economic measures of risk-adjusted value and capital requirements and their uses in decision-making processes."

9 The general business environment

9.1 Regulatory environment

- 9.1.1 Describe the principles and aims of prudential and market conduct regulatory regimes.
- 9.1.2 Discuss the role that major financial institutions can play in supporting the regulatory and business environment.
- 9.1.3 Explain the concept of information asymmetry.
- 9.1.4 Explain how certain features of financial contracts might be identified as unfair.
- 9.1.5 Discuss the implications of a requirement to treat the customer fairly.
- 9.1.6 Describe the aims of policy developments with respect to climate risks and sustainability.

9.2 External environment

Describe the implications for the main providers of benefits on contingent events of:

- legislation and regulations;
- State benefits;
- tax;
- accounting standards;
- capital adequacy and solvency ;
- corporate governance;
- risk management requirements;
- competitive advantage;
- commercial requirements;
- changing cultural and social trends;
- climate change;
- demographic changes;
- environmental issues;
- lifestyle considerations;
- international practice; and
- technological changes.

9.3 Investment environment

- 9.3.1 Discuss the cashflows of simple financial arrangements and the need to invest appropriately to provide for financial benefits on contingent events.
- 9.3.2 Demonstrate a knowledge and understanding of the characteristics of the principal investment assets and of the markets in such assets.
- 9.3.3 Describe how the risk profile of the principal investment assets affects the market in such assets.
- 9.3.4 Explain the principal economic influences on investment markets.
- 9.3.5 Describe other factors affecting supply and demand in investment markets.

10 Specifying the problem

10.1 Contract design

Discuss the factors to be considered in determining a suitable design for financial products that will provide benefits on contingent events in relation to:

- the characteristics of the parties involved;
- the risk appetite or risk aversion of the parties involved;
- the regulatory environment;
- the market for the product;
- competitive pressures;
- the level and form of benefits to be provided;
- any options or guarantees that may be included;
- the benefits payable on discontinuance or transfer of rights;
- the method of financing the benefits to be provided;
- the choice of assets when benefits are funded;
- administrative issues;
- the charges that will be levied; and
- the capital requirements.

10.2 Data

- 10.2.1 Explain the ethical and regulatory issues involved in working with personal data and extremely large data sets.
- 10.2.2 Describe the risks involved with storing and processing personal data
- 10.2.3 Explain the main issues to be addressed by a data governance policy and its importance for an organization.
- 10.2.4 Explain the risks associated with use of data (including algorithmic decision making).

10.2.5 Discuss the data requirements for determining values for assets, future benefits and future funding requirements.

10.2.6 Identify the main sources of data and the specific considerations to be taken when deciding on using these data

10.2.7 Describe the checks that can and should be made on data.

10.2.8 Describe the circumstances under which the ideal data required might not be available and discuss ways in which this problem may be overcome.

10.2.9 Describe how to determine the appropriate grouping of data to achieve the optimal level of homogeneity.

10.2.10 Discuss the use of data to analyse risk factors and set rating factors.

11 Producing the solution

11.1 Modelling

11.1.1 Describe the approaches available to produce the solution to an actuarial or financial problem.

11.1.2 Describe the construction of actuarial models to produce solutions in terms of:

- the objectives of the model
- the operational issues that should be considered in designing and running models.

11.1.3 Describe the use of models for:

- pricing or setting future financing strategies
- risk management: assessing the capital requirements and the return on capital or the funding levels required
- assessing the provisions needed for existing commitments to provide benefits on contingent events
- pricing and valuing options and guarantees.

11.1.4 Describe how sensitivity analysis of the results of the models can be used to help decision making.

11.2 Assumption setting

11.2.1 Describe the principles behind the determination of assumptions as input to a model relevant to producing a specific solution having regard to:

- the types of information that may be available to help in determining the assumptions to be used;
- the extent to which each type of information may be useful, and the other considerations that may be taken into account, in deciding the assumptions; and
- the level of prudence in the assumptions required to meet the objectives of the client.

11.2.2 Describe the key assumptions of the main financial products.

11.3 Mortality and morbidity

11.3.1 Describe the principal forms of heterogeneity within a population, the ways in which selection can occur, and how the use of risk classification can address the consequences of selection.

11.3.2 Explain why it is necessary to have different mortality tables for different classes of lives.

11.3.3 State the principal factors which contribute to the variation in mortality and morbidity by region and according to the social and economic environment, specifically:

- occupation
- nutrition
- housing
- climate/geography
- education
- genetics

11.3.4 Explain how various types of selection (e.g. temporary initial selection, class selection) can be expected to occur among individuals or groups effecting financial products.

11.3.5 Explain the concept of mortality convergence.

11.3.6 Describe how decrements can have a selective effect on the remaining business.

11.4 Expenses

- 11.4.1 Describe the types of expenses that the providers of benefits on contingent events must meet.
- 11.4.2 Describe how expenses might be allocated when pricing financial products.

11.5 Developing the cost and the price

- 11.5.1 Discuss how to determine the cost of providing benefits on contingent events.
- 11.5.2 Discuss the factors to take into account when determining the appropriate level and incidence of contributions to provide benefits on contingent events.
- 11.5.3 Discuss the factors to take into account when determining the price or the contributions to charge for benefits on contingent events.
- 11.5.4 Discuss the influence of provisioning, or regulatory capital requirements on pricing or setting financing strategies.

11.6 Investment management

- 11.6.1 Discuss the principles and objectives of investment management and analyse the investment needs of an investor, taking into account liabilities, liquidity requirements and the risk appetite of the investor.
(Investors to consider are individuals, groups or financial services/product providers)
- 11.6.2 Discuss the different methods for the valuation of individual investments and demonstrate an understanding of their appropriateness in different situations.
- 11.6.3 Discuss the theoretical relationships between the total returns and the components of total returns, on equities, bonds and cash, and price and earnings inflation.
- 11.6.4 Discuss the different methods for the valuation of portfolios of investments and demonstrate an understanding of their appropriateness in different situations.
- 11.6.5 Discuss methods of quantifying the risk of investing in different classes and sub- classes of investment.

11.7 Provisioning

11.7.1 Discuss the different reasons for the valuation of the benefits from financial products and the impact on the choice of methodology and assumptions.

11.7.2 Discuss how to determine values for provisions in terms of:

- the need for placing values on provisions and the extent to which values should reflect risk management strategy;
- the principles of 'fair valuation' of assets and liabilities and other 'market consistent' methods of valuing the liabilities;
- the reasons why the assumptions used may differ in different circumstances;
- the reasons why the assumptions and methods used to place a value on guarantees and options may differ from those used for calculating the accounting provisions needed;
- how sensitivity analysis can be used to check the appropriateness of the values; and
- be able to perform calculations to demonstrate an understanding of the valuation methods.

11.7.3 Describe different methods of allowing for risk in cash-flows.

11.7.4 Discuss different methods of allowing for uncertainty in present values of liabilities.

11.7.5 Discuss the purpose of and uses for equalisation reserves.

11.7.6 Describe the influence of comparisons with market values.

11.8 Relationship between assets and liabilities

11.8.1 Describe the principles of investment and the asset/liability matching requirements of the main providers of benefits on contingent events.

11.8.2 Show how actuarial techniques such as asset/liability modelling may be used to develop an appropriate investment strategy.

11.8.3 Describe the use of a risk budget for controlling risks in a portfolio.

11.8.4 Describe the techniques used to construct and monitor a specific asset portfolio.

11.8.5 Discuss the need to monitor investment performance and to review investment strategy.

12 Living with the solution

12.1 Maintaining profitability

12.1.1 Describe how the main providers of benefits on contingent events can control and manage the cost of:

- payments arising on contingent events
- expenses associated with the payment of benefits on contingent events

12.1.2 Discuss how regulatory capital requirements impact on a provider's profitability.

12.1.3 Describe the tools available for capital management.

12.2 Determining the actual results

12.2.1 Describe how a provider can analyse actual performance against expected performance.

12.2.2 Describe how a provider can analyse performance of an investment portfolio against a benchmark.

12.2.3 Discuss the possible sources of surplus/profit and the management actions that can control the amount of surplus/profit.

12.2.4 Describe why a provider will carry out an analysis of the changes in its surplus/profit.

12.2.5 Describe how any surplus/profit arising may be distributed.

12.2.6 Discuss the issues surrounding the amount of surplus/profit that may be distributed at any time and the rationale for retention of surplus/profit.

12.3 Reporting actual results

12.3.1 Describe the reports and systems which may be set up to control the progress of the financial condition of the main providers of benefits on contingent events.

12.3.2 Describe the reports and systems which may be set up to monitor and manage risk at the enterprise level.

12.3.3 Discuss the issues facing the main providers of benefits on contingent events relating to reporting of risk.

12.4 Insolvency and closure

Discuss the issues that need to be taken into account on the insolvency or closure of a provider of benefits on contingent events.

12.5 Options and guarantees

Discuss the issues surrounding the management of options and guarantees.

13 Monitoring

13.1 Describe how the actual experience can be monitored and assessed, in terms of:

- the reasons for monitoring experience
- the data require
- the process of analysis of the various factors affecting the experience
- the use of the results to revise models and assumptions

13.2 Describe how the results of the monitoring process in the Actuarial Control Cycle or the Risk Management Control Cycle are used to update the financial planning in a subsequent period.

14 Have an understanding of the principal terms used in financial services, investments, asset management and risk management.

Assessment

The assessment will consist of two unseen written papers held in an invigilated environment. Both papers will have 15 minutes reading time and 3 hours writing time. Each paper will be marked out of 100 and the scores for the two papers will be aggregated. Each paper will cover bookwork, applications and higher-order skills. There will be no requirement to pass or to reach a minimum standard on either paper on a stand-alone basis.

In the examination questions may be set on any area of work in which actuaries participate, including wider fields such as banking, environmental issues, management of natural resources, and other topics. Questions will not require

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technical knowledge of the subject context beyond the material covered in this and the A1 and A2 subjects, but a general understanding of the business, commercial, social and natural environment will be assumed.

End of Syllabus