Institute and Faculty of Actuaries

Fellowship Qualification

Financial Derivatives (SP6)

Specialist Principles

Syllabus for the 2026 Examinations

April 2025

Financial Derivatives (SP6)

Syllabus for the 2026 Examinations

This syllabus includes information to support the study of this subject. It will guide you through what you need to learn, application of learning as well as the skills that you need to develop. Information regarding the assessment of this subject is also included.

This syllabus includes:

- Aim of the subject
- How this subject links across the Qualifications
- Subject topics and topic weightings
- Subject objectives
- Assessment information

Aim

Understand, in detail, different types of financial derivatives and their uses, the markets in which they are traded, methods of valuation of financial derivatives and the assessment and management of risks associated with a portfolio of derivatives.

Links across the Qualifications

Associateship Qualification

CM2 – Financial Engineering and Loss Reserving
- Knowledge and concepts in covered in Economic modelling (CM2) are essential. Derivatives rely on various aspects of financial mathematics and concepts related to financial engineering (for example where cash flows are separated, modified or bounded in accordance with an investor's needs).

CP1 – Actuarial Practice
- Derivatives are often used as a risk management tool. Actuarial Practice (CP1) provides a fundamental background to different types of risk from an actuarial perspective and how or why these might be managed.

Fellowship Qualification

Investment and Finance Principles (SP5), Investment and Derivatives Principles (SP6) and Investment and Finance Advanced (SA7) are considered a trio of subjects for the actuarial work specific to Investment and Finance. Concepts introduced in SP5 are developed in Investment and Finance Specialist Advanced (SA7) via more complex 'real world' problems. SP6 focusses in detail on the technical aspects of derivatives and their use.

Topics and topic weightings

1. Derivative markets [5%]
2. Derivative types and uses [20%]
3. Derivative pricing and valuation methods, including interest rate models [50%]
4. Management of derivatives [25%]

Objectives

1 Derivative markets [5%]

Understand how different financial markets for derivatives operate, the main market participants (including their motives) and how settlement operates.

1.1 Awareness of the basic characteristics of derivatives markets

1.2 Describe the characteristics of exchange traded contracts and Over-The-Counter (OTC) contracts

1.3 Understand the uses of forwards, futures and options by different types of traders: hedgers, speculators and arbitrageurs

1.4 Understand of how futures and options markets work

1.5 Understand the operation of central counterparty clearing houses (CCPs) and the related regulatory environment

2 Derivative types and uses [20%]

Understand the different types of derivative contracts and their uses within different rates of interest, equity and exchange and understand how OTC contracts can be used to hedge type liability and risk.

2.1 Understand the payoffs of forwards and futures, calls and puts (American and European)

2.2 Understand forward and futures pricing

2.3 Understand how derivatives can be used for various types of hedges

2.4 Understand different types of derivative contracts and their uses, including:

- Stock options
- Currency options
- Index options
- Options on futures
- Warrants
- Convertibles property derivatives

2.5 Understand the different types of interest rates and interest rate derivatives, including:

- Treasury rates
- Reference interest rates
- Overnight index swap rates
- Repo rates

- Zero rates
- Forward rates
- Forward rate agreements
- Interest rate futures
- Treasury bond futures
- Interest rate swaps
- European swap options (swaptions)
- Caps and caplets
- Floors and floorlets
- Bermudan swaptions

2.6 Understand the following exotic equity and foreign exchange derivatives:

- Quanto options
- Chooser options
- Barrier options
- Binary options
- Lookback options
- Asian options
- Exchange options
- Basket options

2.7 Understand structured securities and OTC contracts, and how they can be used to hedge certain types of liability

- Separate Trading of Registered Interest and Principal of Securities (STRIPS)
- Interest rate swaps
- Interest rate swaptions
- Index-linked bonds
- Inflation swaps
- Limited Price Indexation (LPI) swaps
- LPI bonds

2.8 Understand how structured securities and OTC contracts can be used to hedge non-economic risks such as longevity

2.9 Understand credit derivatives, including Credit Default Swaps (CDSs)

- Collateralised Debt Obligations (CDOs)
- Nth to default baskets
- Total return swaps

2.9.1 Understand the relationship between CDSs and corporate bonds, as shown by their relative credit spreads

2.9.2 Understand the uses of credit derivatives

3 Derivative pricing and valuation methods, including interest rate models [50%]

Explore, in detail, how derivatives are priced, the factors which should be taken into consideration and models used to determine them, including an understanding on how these models affect the outcome.

3.1 Understand the factors that affect option prices, including

- Stock price
- Strike price
- Term to expiry
- Volatility
- Risk-free rate
- Dividends

3.2 Use the binomial model to determine derivative prices and hedging strategies, including

- Sample paths
- Filtrations
- The Binomial Representation Theorem
- Conditional expectations
- Previsible process
- Self-financing portfolio strategies
  - Replicating strategies
  - Pricing under the martingale measure

3.3 Understand the main concepts underlying derivative pricing and hedging strategies, including

- Brownian motion
- Itô calculus
- Itô's Lemma
- Statement of the Cameron–Martin–Girsanov Theorem
- The concept of the Radon–Nikodym derivative
- Change of measure
- Statements of the Martingale Representation Theorem
- Continuous-time portfolio strategies
- Self-financing portfolios in continuous time
- The Black–Scholes model
- Construction of replicating strategies using the martingale approach
- The Black–Scholes formula for non-dividend-paying stocks

3.4 Use more complicated applications of the Black–Scholes model to determine derivative prices including:

3.4.1 Adapt the martingale approach to price foreign exchange options and options on stock indices paying dividends continuously

3.4.2 Understand the derivation of the Black–Scholes–Merton partial differential equation

3.4.3 Understand the role of the market price of risk in the transfer between the real-world and the risk-neutral probability measures

3.4.4 Understand the role of the volatility parameter in the valuation of options, including:

- Calculation of implied volatility from option prices
- Estimation of volatility from historical time series or other market indices (e.g. the VIX index)
- The 'smile' effect and volatility surfaces

3.4.5 Understand approaches to value options on discrete dividend-paying securities

3.5 Use alternative numerical methods to determine derivative prices and hedging strategies, including:

3.5.1 Numerical methods to determine equity and foreign exchange derivative prices and hedging strategies:

- Binomial and trinomial trees
- Monte Carlo techniques
- Finite difference methods

3.5.2 Different methods to determine prices of American options, including Monte Carlo simulation using the least squares (Longstaff–Schwartz) approach

3.6 Calculate the price of interest rate derivatives, including the use of the Black model

3.6.1 Know how to determine:

- The yield curve, zero rates, forward rates and bond prices
- The relationship between forward rates and futures rates
- The value of interest rate swaps

3.6.2 Understand the relationship between swap quotes and swap zero rates

3.6.3 Apply the Black model to price and value:

- Bond options
- Caps and floors
- European swaptions

3.6.4 Evaluate the assumptions underlying Black's model

3.7 Understand models of the term structure of interest rates including:

3.7.1 Difference between equilibrium and no-arbitrage models

3.7.2 Hull and White model for the term structure of interest rates

3.7.3 Differences between the Hull and White model and the Vasicek and Cox–Ingersoll–Ross models

3.7.4 Use of the risk-neutral approach to pricing, understand and apply relevant numerical techniques to value an interest rate derivative, including:

3.7.5 Valuation methods for an interest rate derivative using an appropriate forward measure and zero- coupon bond

3.7.6 Role of the market price of risk and changes of numeraire in the dynamics of term structure models

3.7.7 Interest rate models in a multifactor setting

3.7.8 Characteristics of the Heath, Jarrow and Morton (HJM) and Brace Gatarek Musiela (BGM) Model

3.7.9 Use of the BGM Model to price caps and swaptions

3.7.10 Use of Black's model in the calibration of the BGM Model, and problems with this approach

3.8 Use different approaches to price property swaps

3.9 Understand the pricing of credit derivatives including:

3.9.1 Pricing a credit default swap

3.9.2 The role of correlation in pricing credit derivatives

4 Management of derivatives [25%]

Methods used by both investors in derivatives and providers of derivatives to manage the risks which come with these instruments.

4.1 Understand how derivatives are used by investors

4.1.1 How derivatives help investors meet their objectives

4.1.2 How derivatives change in the risk profile of a portfolio

4.1.3 Practical issues and limitations arising from derivative use

4.1.4 Compare alternative strategies

4.2 Understand how to hedge derivatives

4.2.1 Calculate the partial derivatives (the Greeks)

4.2.2 Use of the Greeks in hedging individual derivatives and portfolios of derivatives

4.2.3 How option prices and Greeks change in relation to underlying variables

4.2.4 Manage portfolios of derivatives using scenario analysis

4.2.5 Risk management characteristics of a given derivative, including exotic contracts

4.2.6 Hedging of interest rate derivatives with respect to underlying parameters (the Greeks)

4.2.7 Delta hedging techniques in relation to credit default swaps

4.3 Understand what is meant by basis risk and its impact on hedging strategies

4.4 Understand the risks that arise in the use of derivatives and how to manage them, including

4.4.1 Market risk, credit (or counterparty) risk and liquidity risk

4.4.2 Risks that affect the use of derivatives and how these risks may be handled

4.4.3 Possible methods for establishing Value-at-Risk (on a portfolio)

4.4.4 Weaknesses of the Value-at-Risk measure

4.4.5 Use and limitations of credit ratings

4.4.6 Simple techniques for measuring and managing credit (or counterparty) risk on derivatives, including:

- International Swaps and Derivatives Association (ISDA) agreements
- Collateral management

4.4.7 Risks that arise in the use of specific types of derivative

4.5 Understand how special purpose vehicles can be used as part of a mechanism for risk transfer, including the role of a credit enhancement agency

Assessment

The assessment of this subject will consist of one examination.

Candidates can expect to answer a number of questions of varying marks, using Microsoft Word to construct and type their answers. The duration of this examination is three hours and twenty minutes and is timed and online. This time includes reading time.

Candidates will be expected to be able to apply knowledge and skills from across the syllabus topics to scenarios and questions proposed by the examiners and produce coherent solutions and actions, including:

- Analysis of complex problems in terms of actuarial, economic and financial factors to a level where appropriate analytical techniques may be used.
- Assess the implications and relevance of such factors, integrating the results into a coherent whole.
- Evaluate the results critically in a wider context, drawing appropriate conclusions.
- Propose solutions and actions, or a range of possible solutions and actions, based on this evaluation.

Topic weighting

The topic weighting percentage noted alongside the topics is indicative of the volume of content of a topic within the subject and therefore broadly aligned to the volume of marks allocated to this topic in the examination. For example if a topic is 20% of the subject then you can expect that approximately 20% of the total marks available in the examination paper will be available on that topic.

Candidates for assessment should ensure that they are well prepared across the entire syllabus and have an understanding of the principal terms used in financial derivatives. The examination can be composed of questions drawing from any part of the syllabus within any examination sitting and using any command verb. This includes knowledge, techniques, principles, theories, and concepts as specified. Candidates should not rely on past papers alone and should ensure they have covered the entire syllabus as part of their learning and development of this subject. A list of command verbs used in the examinations is included on the IFoA website.

In each examination, candidates will be expected to demonstrate, through their answers, that they have knowledge of, can apply and use higher order skills in this subject:

- Knowledge will be demonstrated through answering questions that assess your understanding of that knowledge as well as through questions that ask you to apply relevant knowledge to scenarios.
- Application will be demonstrated through answering questions which assess that you can identify and apply relevant concepts and skills to solve problems (both numerical and non-numerical).
- Higher order skills will be demonstrated through questions that will assess that you can use relevant knowledge, concepts and skills to solve problems, draw appropriate conclusions, and make meaningful and appropriate comments on those conclusions.

As a guide, in the examination of this subject, you can expect that approximately 10% of the total number of marks for this examination be allocated to the demonstration of knowledge, 60% to application and 30% to higher order.

IFoA Guidance and Regulations

Please ensure you have read and understood the Assessment Regulations and Examinations handbook ahead of your exam. Useful and important information can be found in the Qualifications Handbook. These are all available on the IFoA website.

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