IB3K2-15 Financial Optimisation

26/27

Department
Warwick Business School
Level
Undergraduate Level 3
Module leader
Richard White
Credit value
15
Module duration
10 weeks
Assessment
20% coursework, 80% exam
Study location
University of Warwick main campus, Coventry

Description

Introductory description

This is an elective module designed specifically for non-WBS students. To find detailed availability and to apply for this module, log in to my.wbs.ac.uk using your normal IT login details and apply via the my.wbs module application system. Once you've secured a place on my.wbs you should apply via your home department's usual process, which usually takes place via eVision. Note that you do not require the module leader's permission to study a WBS module, so please do not contact them to request it.

The module introduces modelling and solution approaches for mathematical programming problems arising in finance. Optimisation methods such as linear, integer, nonlinear, dynamic, and stochastic programming are motivated through practical financial decision-making problems. Key topics covered in Financial Optimisation include the theory of interest, portfolio optimisation, asset allocation, and risk management.

Module web page

Module aims

The module aims to introduce modelling and solving approaches for mathematical programming problems arising in finance. The optimization methods such as linear, integer, dynamic, nonlinear and stochastic programming will be motivated through practical financial decision making

problems. The main topics to be covered in Financial Optimisation include asset allocation, portfolio optimisation, risk management, expected utility maximization, and sustainable finance.

Outline syllabus

This is an indicative module outline only to give an indication of the sort of topics that may be covered. Actual sessions held may differ.

-Theory of Interest
-Mean-Variance Portfolio Optimisation
-CAPM and Asset Pricing
-Parameter Estimation in Portfolio Optimisation / Robust Asset Allocation
-Discrete Decisions / Constructing an Index Fund
-EUT / Optimal Growth Portfolio
-Sustainable Finance
-Risk Measures
-Dynamic Programming & Stochastic Optimal Control
-Discrete-time Portfolio Selection

Learning outcomes

By the end of the module, students should be able to:

- Define concepts and optimisation methods commonly used in finance.
- Use a range of techniques to solve typical financial optimisation problems.
- Analyse the particular challenges of modelling and solving financial optimisation problems.
- Identify appropriate methods for financial optimisation problems.
- Determine the strengths and weaknesses of different approaches.
- Analyse case studies and model the underlying problems properly.

Indicative reading list

Reading lists can be found in Talis

Subject specific skills

Model decision making problems in finance.

Transferable skills

Distinguish between different modelling and solution approaches for finance problems.

Study

Study time

Type	Required
Lectures	10 sessions of 1 hour (7%)
Seminars	9 sessions of 1 hour (6%)
Online learning (independent)	10 sessions of 1 hour (7%)
Private study	48 hours (32%)
Assessment	73 hours (49%)
Total	150 hours

Private study description

Private Study.

Costs

No further costs have been identified for this module.

Assessment

You do not need to pass all assessment components to pass the module.

Assessment group D6

	Weighting	Study time	Eligible for self-certification
Assessment component			
Individual Assignment	20%	15 hours	Yes (extension)
Reassessment component is the same			
Assessment component			
Centrally-timetabled examination (On-campus) Exam	80%	58 hours	No

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	Weighting	Study time	Eligible for self-certification

- Answerbook Pink (12 page)
- Students may use a calculator

Reassessment component is the same

Feedback on assessment

Feedback via my.wbs.

Past exam papers for IB3K2

Availability

Pre-requisites

Students are required to have basic knowledge on mathematical modelling and statistics. The pre-requisites are (IB104) Mathematical Programming I or (IB207) Mathematical Programming II.

To take this module, you must have passed:

- Any of
  - IB104-12 Mathematical Programming I
  - IB207-12 Mathematical Programming II

Courses

This module is Optional for:

- USTA-G300 Undergraduate Master of Mathematics,Operational Research,Statistics and Economics
  - Year 3 of G30A Master of Maths, Op.Res, Stats & Economics (Actuarial and Financial Mathematics Stream)
  - Year 3 of G30J Master of Maths, Op.Res, Stats & Economics (Data Analysis Stream)
  - Year 3 of G30B Master of Maths, Op.Res, Stats & Economics (Econometrics and Mathematical Economics Stream)
  - Year 3 of G30C Master of Maths, Op.Res, Stats & Economics (Operational Research and Statistics Stream)
  - Year 3 of G30C Master of Maths, Op.Res, Stats & Economics (Operational Research and Statistics Stream)
  - Year 3 of G30D Master of Maths, Op.Res, Stats & Economics (Statistics with

Mathematics Stream)
    - Year 3 of G300 Mathematics, Operational Research, Statistics and Economics
    - Year 3 of G300 Mathematics, Operational Research, Statistics and Economics
    - Year 3 of G300 Mathematics, Operational Research, Statistics and Economics
    - Year 4 of G30A Master of Maths, Op.Res, Stats & Economics (Actuarial and Financial Mathematics Stream)
    - Year 4 of G30J Master of Maths, Op.Res, Stats & Economics (Data Analysis Stream)
    - Year 4 of G30B Master of Maths, Op.Res, Stats & Economics (Econometrics and Mathematical Economics Stream)
    - Year 4 of G30C Master of Maths, Op.Res, Stats & Economics (Operational Research and Statistics Stream)
    - Year 4 of G30C Master of Maths, Op.Res, Stats & Economics (Operational Research and Statistics Stream)
    - Year 4 of G30D Master of Maths, Op.Res, Stats & Economics (Statistics with Mathematics Stream)
    - Year 4 of G300 Mathematics, Operational Research, Statistics and Economics
    - Year 4 of G300 Mathematics, Operational Research, Statistics and Economics
    - Year 4 of G300 Mathematics, Operational Research, Statistics and Economics
- USTA-G1G3 Undergraduate Mathematics and Statistics (BSc MMathStat)
    - Year 3 of G1G3 Mathematics and Statistics (BSc MMathStat)
    - Year 4 of G1G3 Mathematics and Statistics (BSc MMathStat)
- USTA-GG14 Undergraduate Mathematics and Statistics (BSc)
    - Year 3 of GG14 Mathematics and Statistics
    - Year 3 of GG14 Mathematics and Statistics
- USTA-Y602 Undergraduate Mathematics,Operational Research,Statistics and Economics
    - Year 3 of Y602 Mathematics,Operational Research,Stats,Economics
    - Year 3 of Y602 Mathematics,Operational Research,Stats,Economics