IB207-10 Mathematical Programming 2

24/25

Department
> Warwick Business School

Level
> Undergraduate Level 2

Module leader
> Richard White

Credit value
> 10

Module duration
> 10 weeks

Assessment
> 100% exam

Study location
> University of Warwick main campus, Coventry

Description

Introductory description

This module together with its prerequisite IB104 provides an exciting path to the world of Operational Research, Management Science and Analytics. During the course of the module, students will find out "where" (applications), "what" (knowledge) and "how" (skills) about the subject area.

[Module web page](#)

Module aims

This module addresses further theoretical and practical problems of mathematical programming, based on the prerequisite knowledge of linear programming and the duality theory. It provides an introduction to the world of discrete and non-linear optimization with coverage of application context, theoretical basis and methodological skills.

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.

This module includes coverage of theoretical and practical aspects of mathematical programming.

In particular, it covers: linear programming problems with integer variables; the branch-and-bound algorithm; dynamic programming; network optimization; approximation algorithms; and convexity analysis.

Learning outcomes

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

- Identify the business problems that can be modelled using optimisation techniques and formulate them in a suitable mathematical form.
- Apply optimisation techniques to the solution of the problems using spreadsheets and other appropriate software.
- Report on the meaning of the optimal solution in a manner suited to a business context.
- List and challenge the assumptions underpinning each of the key models studied.
- Reflect critically on the limitations of each of the models studied.
- Reflect critically on the limitations of each of the models studied.

Indicative reading list

- Wayne Winston, Operations Research: Applications and Algorithms, 4th Ed., Cengage Learning, 2022
- Frederick Hillier and Gerald Lieberman, Introduction to Operations Research, 11th Ed., McGraw-Hill Education, 2021
- Bernhard Korte and Jens Vygen, Combinatorial Optimization: Theory and Algorithms. 6th Ed., Springer, 2018

Interdisciplinary

Core module for key interdisciplinary degree (MORSE).

Subject specific skills

Analytically solve optimization problems.

Transferable skills

Model a business optimisation problem and construct spreadsheets to solve an optimisation problem.

Study

Study time

Type	Required
Lectures	10 sessions of 2 hours (20%)
Private study	36 hours (36%)
Assessment	44 hours (44%)
Total	100 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 B

	Weighting	Study time
Examination	100%	44 hours

- Answerbook Pink (12 page)
- Graph paper

Feedback on assessment

Feedback provided via my.wbs.

[Past exam papers for IB207](#)

Availability

Pre-requisites

To take this module, you must have passed:

- All of

  - [IB104-12 Mathematical Programming I](#)

Courses

This module is Core for:

- USTA-Y602 Undergraduate Mathematics,Operational Research,Statistics and Economics
  - Year 2 of Y602 Mathematics,Operational Research,Stats,Economics
  - Year 2 of Y602 Mathematics,Operational Research,Stats,Economics

This module is Optional for:

- Year 2 of UCSA-I1N1 Undergraduate Computer Science with Business Studies

This module is Option list A for:

- USTA-G302 Undergraduate Data Science
  - Year 2 of G302 Data Science
  - Year 2 of G302 Data Science

This module is Option list B for:

- UCSA-G500 Undergraduate Computer Science
  - Year 2 of G500 Computer Science
  - Year 2 of G500 Computer Science
- UCSA-G503 Undergraduate Computer Science MEng
  - Year 2 of G500 Computer Science
  - Year 2 of G503 Computer Science MEng
  - Year 2 of G503 Computer Science MEng
- UMAA-G100 Undergraduate Mathematics (BSc)
  - Year 2 of G100 Mathematics
  - Year 2 of G100 Mathematics
  - Year 2 of G100 Mathematics
- Year 2 of UMAA-G103 Undergraduate Mathematics (MMath)
- USTA-GG14 Undergraduate Mathematics and Statistics (BSc)
  - Year 2 of GG14 Mathematics and Statistics
  - Year 2 of GG14 Mathematics and Statistics