

IB104-10 Mathematical Programming 1

24/25

Department

Warwick Business School

Level

Undergraduate Level 1

Module leader

Richard White

Credit value

10

Module duration

5 weeks

Assessment

100% exam

Study location

University of Warwick main campus, Coventry

Description

Introductory description

This is a short intensive module on theoretical and practical aspects of linear programming, including an introduction to other optimization techniques. This module will be run in the first five weeks of Term 3. The module is a prerequisite for IB2070 Mathematical Programming II.

[Module web page](#)

Module aims

At the end of the module students will be able to recognise, formulate and solve practical resource allocation and planning problems. Module members will also be able to identify the limitations of the approaches. This module serves as a prerequisite for further modules in integer and non-linear programming, which are available to students in their second and final years.

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.

Introduction to Operational Research
Introduction to Linear Programming

Introduction to basic algorithms for solving linear programming problems
Practical computer work using a Linear Programming computer package
Formulation methods and Interpretation of solutions
Distribution / transportation models
Introduction to Game Theory

Learning outcomes

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

- Recognise, formulate and solve business optimisation problems.
- List and challenge the assumptions underpinning each of the key models studied.
- Reflect critically on the limitations of each of the models studied.
- Report on the meaning of the optimal solutions in a manner suited to a business context.

Indicative reading list

D. R. Anderson, D. J. Sweeney, T. A. Williams, J. D. Camm and J. J. Cochran (2015). An Introduction to Management Science: Quantitative Approaches to Decision Making. Cengage Learning.

Bynum, M.L. (2022) Pyomo - optimization modeling in Python. Third edition. Cham, Switzerland: Springer.

Interdisciplinary

Core module for key interdisciplinary degree (MORSE).

Subject specific skills

Analytically solve linear optimisation problems.

Transferable skills

Model a business optimisation problem in a suitable mathematical form and interpret optimal mathematical solutions in the business context.

Study

Study time

Type	Required
Lectures	24 sessions of 1 hour (24%)
Private study	30 hours (30%)
Total	100 hours

Type	Required
Assessment	46 hours (46%)
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 B2

	Weighting	Study time
Examination	100%	46 hours
<ul style="list-style-type: none">• Answerbook Pink (12 page)• Graph paper		

Feedback on assessment

Feedback will be provided via my.wbs.

[Past exam papers for IB104](#)

Availability

Courses

This module is Core for:

- USTA-G302 Undergraduate Data Science
 - Year 1 of G302 Data Science
 - Year 1 of G302 Data Science
- Year 1 of USTA-G304 Undergraduate Data Science (MSci)
- Year 1 of USTA-G300 Undergraduate Master of Mathematics,Operational Research,Statistics and Economics

- USTA-Y602 Undergraduate Mathematics, Operational Research, Statistics and Economics
 - Year 1 of Y602 Mathematics, Operational Research, Stats, Economics
 - Year 1 of Y602 Mathematics, Operational Research, Stats, Economics

This module is Optional for:

- UCSA-G500 Undergraduate Computer Science
 - Year 1 of G500 Computer Science
 - Year 1 of G500 Computer Science
- UCSA-G503 Undergraduate Computer Science MEng
 - Year 1 of G500 Computer Science
 - Year 1 of G503 Computer Science MEng
 - Year 1 of G503 Computer Science MEng
- Year 1 of UCSA-I1N1 Undergraduate Computer Science with Business Studies
- Year 1 of USTA-G1G3 Undergraduate Mathematics and Statistics (BSc MMathStat)
- USTA-GG14 Undergraduate Mathematics and Statistics (BSc)
 - Year 1 of GG14 Mathematics and Statistics
 - Year 1 of GG14 Mathematics and Statistics

This module is Option list B for:

- Year 1 of UMAA-G105 Undergraduate Master of Mathematics (with Intercalated Year)
- UMAA-G100 Undergraduate Mathematics (BSc)
 - Year 1 of G100 Mathematics
 - Year 1 of G100 Mathematics
 - Year 1 of G100 Mathematics
- UMAA-G103 Undergraduate Mathematics (MMath)
 - Year 1 of G100 Mathematics
 - Year 1 of G103 Mathematics (MMath)
 - Year 1 of G103 Mathematics (MMath)
- Year 1 of UMAA-G106 Undergraduate Mathematics (MMath) with Study in Europe
- Year 1 of UMAA-G1NC Undergraduate Mathematics and Business Studies
- Year 1 of UMAA-G1N2 Undergraduate Mathematics and Business Studies (with Intercalated Year)
- Year 1 of UMAA-GL11 Undergraduate Mathematics and Economics
- Year 1 of UECA-GL12 Undergraduate Mathematics and Economics (with Intercalated Year)
- Year 1 of UMAA-G101 Undergraduate Mathematics with Intercalated Year