IB207-10 Mathematical Programming 2

23/24

Department
> Warwick Business School

Level
> Undergraduate Level 2

Module leader
> Bo Chen

Credit value
> 10

Module duration
> 10 weeks

Assessment
> 30% coursework, 70% exam

Study location
> University of Warwick main campus, Coventry

Description

Introductory description

This is an elective module available for non-WBS students.

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.

[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 optimisation; approximation algorithms; use of basic software for solutions of optimisation problems.

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.
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Indicative reading list

Recommended references:

- Winston, Operations Research: Applications and Algorithms, 4th Ed., 2004 (or later)
- Hillier and G. Lieberman, Introduction to Operations Research, 9th Ed., 2010 (or later)
- H. Papadimitriou and K. Steiglitz, Combinatorial Optimization: Algorithms and Complexity, Dover Publications, 1998.
  Basic terminology and techniques can also be found in the textbooks below:
- Anderson, Sweeney and Williams, An Introduction to Management Science, (any edition), West
- Taylor, Introduction to Management Science, (any edition), Prentice Hall
- Taha, Operations Research: An introduction. (Any addition)

Subject specific skills

Spreadsheet modelling skills.

Transferable skills

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

Study

Study time

Type	Required
Lectures	8 sessions of 2 hours (16%)
Seminars	8 sessions of 1 hour (8%)
Private study	30 hours (30%)
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 D

	Weighting	Study time
Individual Assignment	30%	14 hours
Examination	70%	32 hours

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

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