IB207-12 Mathematical Programming II

22/23

Department
Warwick Business School
Level
Undergraduate Level 2
Module leader
Bo Chen
Credit value
12
Module duration
10 weeks
Assessment
30% coursework, 70% exam
Study location
University of Warwick main campus, Coventry

Description

Introductory description

N/A

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; convex sets and functions and their role in optimisation; simple optimality conditions for
non-linear programming problems; use of spreadsheets for the solution of optimisation problems

Learning outcomes

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

- Apply optimisation techniques to the solution of the problems using spreadsheets andother appropriate software;
- Identify the business problems that can be modelled using optimisation techniques andformulate them in a suitable mathematical form;
- 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.
- Report on the meaning of the optimal solutions in a manner suited to a business context.

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	10 sessions of 1 hour (8%)
Private study	47 hours (39%)
Assessment	63 hours (52%)
Total	120 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 D4

	Weighting	Study time
Individual Assignment	30%	17 hours
Online Examination	70%	46 hours
Exam		
~Platforms - AEP		

Feedback on assessment

Feedback via my.wbs.

Past exam papers for IB207

Availability

Pre-requisites

IB104-12 Mathematical Programming I

To take this module, you must have passed:

- All of

- IB104-12 Mathematical Programming I

Post-requisite modules

If you pass this module, you can take:

- IB3K2-15 Financial Optimisation
- IB352-15 Applied Optimization Methods
- IB9BS-15 Supply Chain Analytics

Courses

This module is Core for:

- Year 2 of USTA-G300 Undergraduate Master of Mathematics,Operational Research,Statistics and Economics
- 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 Core optional for:

- Year 2 of UMAA-G1NC Undergraduate Mathematics and Business Studies
- Year 2 of UMAA-G1N2 Undergraduate Mathematics and Business Studies (with Intercalated Year)

This module is Optional for:

- Year 2 of UCSA-I1N1 Undergraduate Computer Science with Business Studies
- USTA-G302 Undergraduate Data Science
    - Year 2 of G302 Data Science
    - Year 2 of G302 Data Science
- Year 2 of USTA-G304 Undergraduate Data Science (MSci)
- Year 2 of USTA-G305 Undergraduate Data Science (MSci) (with Intercalated Year)
- Year 2 of USTA-G1G3 Undergraduate Mathematics and Statistics (BSc MMathStat)
- USTA-GG14 Undergraduate Mathematics and Statistics (BSc)
    - Year 2 of GG14 Mathematics and Statistics
    - Year 2 of GG14 Mathematics and Statistics

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

- Year 2 of UMAA-G105 Undergraduate Master of Mathematics (with Intercalated Year)
- UMAA-G100 Undergraduate Mathematics (BSc)
    - Year 2 of G100 Mathematics
    - Year 2 of G100 Mathematics
    - Year 2 of G100 Mathematics
- UMAA-G103 Undergraduate Mathematics (MMath)
    - Year 2 of G100 Mathematics
    - Year 2 of G103 Mathematics (MMath)
    - Year 2 of G103 Mathematics (MMath)
- Year 2 of UMAA-G106 Undergraduate Mathematics (MMath) with Study in Europe
- Year 2 of UMAA-GL11 Undergraduate Mathematics and Economics
- Year 2 of UECA-GL12 Undergraduate Mathematics and Economics (with Intercalated Year)
- Year 2 of UMAA-G101 Undergraduate Mathematics with Intercalated Year