

# IB3A7-15 The Practice of Operational Research

**23/24**

**Department**

Warwick Business School

**Level**

Undergraduate Level 3

**Module leader**

Eleanor Reynolds

**Credit value**

15

**Module duration**

10 weeks

**Assessment**

20% coursework, 80% exam

**Study location**

University of Warwick main campus, Coventry

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## Description

### Introductory description

The module equips students with the skills to conduct analytical / OR projects in organisations, with an emphasis on practical aspects. Alongside some 'technical', numbers-based content, the module explores the 'soft' tools needed to make analytical projects succeed by aligning analysis with business aims. In this context, students develop basic skills in problem structuring methods (PSMs) to allow them to assume an holistic perspective. Students are asked to critically evaluate the impact of real-world analytical projects and to develop their critical thinking and logical reasoning skills to this end. Students are expected to work collaboratively and the group work elements includes work on a modelling project.

[Module web page](#)

### Module aims

The module equips students with the skills to conduct analytical / OR projects in organisations, with an emphasis on practical aspects. Alongside some 'technical', numbers-based content, the module explores the 'soft' tools needed to make analytical

projects succeed by aligning analysis with business aims. In this context, students develop basic skills in problem structuring methods (PSMs) to allow them to assume an holistic perspective. Students are asked to critically evaluate the impact of real-world analytical projects and to develop their critical thinking and logical reasoning skills to this end. Students are expected to work collaboratively and the group work elements includes work on a modelling project.

## **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.

Students are introduced to the field of Operational Research with emphasis on recent developments in the area of Analytics. A collection of qualitative (Problem Structuring) and quantitative methods are introduced including:

- Systems Thinking;
- Problem Structuring Methods;
- Causal Mapping;
- Soft Systems Methodology (SSM)
- Spreadsheet Modelling;

The module will focus on a selection of methods; this selection may vary from year to year. The critique of an Operational Research/Analytics project is also covered on the module.

## **Learning outcomes**

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

- Understand the practical issues involved in undertaking OR / analytical projects in the real world
- Understand the stages of an OR / analytical project.
- Understand how to apply soft and hard OR tools to real-world problems.
- Critically evaluate impact of real-world OR / analytical projects
- Argue for or against / justify a particular approach to an organizational problem
- Solve quantitative problems using spreadsheet models
- Think innovatively / creatively about organizational problems using PSMs

## **Indicative reading list**

Gifford T, Gremley R (2019) 'Chassis Leasing and Selection Policy for Port Operations'. *INFORMS Journal on Applied Analytics* 49(4):239-248

Hindle, G and Vidgen, R (2018) 'Developing a business analytics methodology: A case study in the foodbank sector', *European Journal of Operational Research*, 268 (3)

Jackson, M (2019) *Critical Systems Thinking And The Management Of Complexity*, Chichester: Wiley.

Pidd, M. (2009) *Tools for Thinking: modelling in Management Science* (3rd ed.), Chichester: Wiley.

Rosenhead, J. and Mingers, J. (2001) *Rational Analysis for a Problematic World Revisited*:

problem structuring methods for complexity, uncertainty and conflict (2nd ed.), Chichester: Wiley.  
Wasserkrug S, Krüger M, Feldman YA, Shindin E, Zeltyn S (2019) 'What's Wrong with My Dishwasher: Advanced Analytics Improve the Diagnostic Process for Miele Technicians'.  
INFORMS Journal on Applied Analytics 49(5):384-396

## Subject specific skills

Think critically, holistically and creatively about organizational situations; specific technical skills such as problem structuring (eg. with rich picturing), quantitative modelling (eg. with spreadsheet modelling), and qualitative modelling (eg. with Soft Systems Methodology (SSM)).

## Transferable skills

Individual working, group working, presentation skills, IT skills, spreadsheet modelling skills, time management, intercultural working.

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## 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	42 hours (28%)
Assessment	79 hours (53%)
Total	150 hours

### Private study description

Private Study.

### Costs

No further costs have been identified for this module.

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## Assessment

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

### Assessment group D7

	<b>Weighting</b>	<b>Study time</b>
Groupwork Presentation Video	20%	16 hours
Examination	80%	63 hours

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- Answerbook Green (8 page)
- Students may use a calculator

## **Feedback on assessment**

Feedback via My.WBS.

[Past exam papers for IB3A7](#)

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## **Availability**

### **Courses**

This module is Optional for:

- UIBA-MN34 Law and Business Four Year (Qualifying Degree)
  - Year 3 of MN34 Law and Business Studies Four Year (Qualifying Degree)
  - Year 4 of MN34 Law and Business Studies Four Year (Qualifying Degree)
- UECA-3 Undergraduate Economics 3 Year Variants
  - Year 3 of L100 Economics
  - Year 3 of L100 Economics
  - Year 3 of L100 Economics
  - Year 3 of L116 Economics and Industrial Organization
  - Year 3 of L116 Economics and Industrial Organization
  - Year 3 of L116 Economics and Industrial Organization
  - Year 3 of L116 Economics and Industrial Organization
- Year 4 of UECA-4 Undergraduate Economics 4 Year Variants
- UPHA-L1CA Undergraduate Economics, Psychology and Philosophy
  - Year 3 of L1CA Economics, Psychology and Philosophy
  - Year 3 of L1CC Economics, Psychology and Philosophy (Behavioural Economics Pathway)
  - Year 3 of L1CD Economics, Psychology and Philosophy (Economics with Philosophy Pathway)
  - Year 3 of L1CE Economics, Psychology and Philosophy (Philosophy and Psychology Pathway)
- UPHA-L1CB Undergraduate Economics, Psychology and Philosophy (with Intercalated Year)

- Year 4 of L1CG Economics, Psychology and Philosophy (Behavioural Economics Pathway) (with Intercalated Year)
- Year 4 of L1CH Economics, Psychology and Philosophy (Economics with Philosophy Pathway) (with Intercalated Year)
- Year 4 of L1CJ Economics, Psychology and Philosophy (Philosophy and Psychology Pathway) (with Intercalated Year)
- Year 4 of L1CB Economics, Psychology and Philosophy (with Intercalated Year)
- Year 4 of L1CB Economics, Psychology and Philosophy (with Intercalated Year)
- Year 3 of UIBA-MN31 Undergraduate Law and Business Studies
- Year 3 of UIBA-MN32 Undergraduate Law and Business Studies
- Year 5 of UIBA-MN37 Undergraduate Law and Business Studies (Qualifying Degree) with Intercalated Year
- UIBA-MN35 Undergraduate Law and Business Studies with Intercalated Year (3+1)
  - Year 3 of MN35 Law and Business Studies with Intercalated Year (3+1)
  - Year 4 of MN35 Law and Business Studies with Intercalated Year (3+1)
- USTA-G300 Undergraduate Master of Mathematics, Operational Research, Statistics and Economics
  - Year 3 of G300 Mathematics, Operational Research, Statistics and Economics
  - Year 4 of G300 Mathematics, Operational Research, Statistics and Economics
- Year 3 of UMAA-GL11 Undergraduate Mathematics 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-G1G4 Undergraduate Mathematics and Statistics (BSc MMathStat) (with Intercalated Year)
  - Year 4 of G1G4 Mathematics and Statistics (BSc MMathStat) (with Intercalated Year)
  - Year 5 of G1G4 Mathematics and Statistics (BSc MMathStat) (with Intercalated Year)

This module is Unusual option for:

- UPHA-L1CA Undergraduate Economics, Psychology and Philosophy
  - Year 2 of L1CA Economics, Psychology and Philosophy
  - Year 3 of L1CA Economics, Psychology and Philosophy
- UPHA-V7ML Undergraduate Philosophy, Politics and Economics
  - Year 3 of V7ML Philosophy, Politics and Economics (Tripartite)
  - Year 3 of V7ML Philosophy, Politics and Economics (Tripartite)
  - Year 3 of V7ML Philosophy, Politics and Economics (Tripartite)

This module is Option list A for:

- 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
- Year 4 of USTA-Y603 Undergraduate Mathematics, Operational Research, Statistics, Economics (with Intercalated Year)

This module is Option list B for:

- Year 4 of UCSA-G504 MEng Computer Science (with intercalated year)
- UCSA-G500 Undergraduate Computer Science
  - Year 3 of G500 Computer Science
  - Year 3 of G500 Computer Science
- UCSA-G502 Undergraduate Computer Science (with Intercalated Year)
  - Year 4 of G502 Computer Science with Intercalated Year
  - Year 4 of G502 Computer Science with Intercalated Year
- UCSA-G503 Undergraduate Computer Science MEng
  - Year 3 of G500 Computer Science
  - Year 3 of G503 Computer Science MEng
  - Year 3 of G503 Computer Science MEng
- USTA-GG14 Undergraduate Mathematics and Statistics (BSc)
  - Year 3 of GG14 Mathematics and Statistics
  - Year 3 of GG14 Mathematics and Statistics
- Year 4 of USTA-GG17 Undergraduate Mathematics and Statistics (with Intercalated Year)

This module is Option list C for:

- USTA-G300 Undergraduate Master of Mathematics,Operational Research,Statistics and Economics
  - 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 5 of USTA-G301 Undergraduate Master of Mathematics,Operational Research,Statistics and Economics (with Intercalated

This module is Option list D for:

- USTA-G300 Undergraduate Master of Mathematics,Operational Research,Statistics and Economics
  - 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)
- USTA-G301 Undergraduate Master of Mathematics,Operational Research,Statistics and Economics (with Intercalated
  - Year 3 of G30G Master of Maths, Op.Res, Stats & Economics (Operational Research and Statistics Stream) Int
  - Year 4 of G30G Master of Maths, Op.Res, Stats & Economics (Operational Research and Statistics Stream) Int

This module is Option list G for:

- UPHA-V7ML Undergraduate Philosophy, Politics and Economics
  - Year 2 of V7ML Philosophy, Politics and Economics (Tripartite)
  - Year 2 of V7ML Philosophy, Politics and Economics (Tripartite)
  - Year 2 of V7ML Philosophy, Politics and Economics (Tripartite)