

# MATH0067 (Operational Research)

<i>Year:</i>	2024–2025
<i>Code:</i>	MATH0067
<i>Level:</i>	Masters
<i>Value:</i>	15 UCL credits (= 7.5 ECTS credits)
<i>Term:</i>	1
<i>Structure:</i>	On campus
<i>Assessment:</i>	100% examination.
<i>Lecturer:</i>	Alejandro Diaz De La O and Luca Grieco

## *Course Description and Objectives*

In this module, we will discuss a range of methods used in Operational Research for assisting with the analysis of problems from a wide range of real-life settings, such as clinical, transport and manufacturing industrial problems. The module will introduce mathematical modelling methods frequently used in Operational Research, including linear programming, integer programming, stochastic analysis, and queuing theory. Students will also be introduced to the practical problem-solving methodology of Operational Research and the processes involved in developing a mathematical structure.

## *Recommended Texts*

- (i) Ross, S., *An Introduction to Probability Models*, 9th Ed, Academic Press, 2006.
- (ii) Winston, W. L, *Operations Research: Applications and algorithms*, Duxbury Press, Boston, 1987.
- (iii) Pidd, M., *Tools for thinking - modelling in management science*, 2nd Ed, John Wiley Son, 2003.

## *Detailed Syllabus*

Brief history of Operational Research.

Network analysis: Theory and applications.

Heuristic methods.

Introduction to stochastic analysis.

Markov chains and Markov processes.

Introduction to queuing theory.

Optimisation methods: non-linear, linear and integer programming.

Exposure to the 'open-ended' practical problem-solving methodology of Operational Research using a real-life case study. Identifying key elements of a practical problem. Relating them in a mathematical framework. The process of developing a modelling structure.

