MATH0067 (Operational Research)

Year:	2023-2024
Code:	MATH0067
Level:	Masters
Value:	15 UCL (= 7.5 ECTS credits)
Term:	1
Structure:	Online

Assessment:	100% examination
Lecturer:	Clinical Operations Research Unit (CORU)
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Course Description and Objectives

The component 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. Many of the example given will concern the application of Operational Research to clinically related problems, although example will also be given related to other areas such as transport and manufacturing industry. The component will introduce mathematical modelling methods frequently used in Operational Research, including linear programming, integer programming, stochastic analysis, queuing theory and compartmental modelling. 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.

Compartmental models.

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.

September 2023