

Liverpool John Moores University

Title: OPERATIONAL RESEARCH
Status: Definitive
Code: **6101MATHS** (124204)
Version Start Date: 01-08-2021

Owning School/Faculty: Computer Science and Mathematics
Teaching School/Faculty: Computer Science and Mathematics

Team	Leader
Vincent Kwasnica	Y

Academic Level: FHEQ6 **Credit Value:** 20 **Total Delivered Hours:** 57
Total Learning Hours: 200 **Private Study:** 143

Delivery Options

Course typically offered: Semester 2

Component	Contact Hours
Lecture	33
Practical	11
Tutorial	11

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Exam	AS1	Examination	100	2

Aims

To examine a wide range of operational research methods and their applicability to real-life problems encountered in business and industry.

Learning Outcomes

After completing the module the student should be able to:

- 1 Apply operations research methods for solution of practical problems.
- 2 Express operational research analyses in the vernacular (for non-experts).
- 3 Formulate and solve problems involving operational research.

Learning Outcomes of Assessments

The assessment item list is assessed via the learning outcomes listed:

Examination	1	2	3
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Outline Syllabus

Linear programming: definition of a linear programming problem, graphical representation, the Simplex method and revised Simplex method, sensitivity analysis.

Transportation problems: transportation algorithm, unequal supply and demand, optimal sourcing problems, trans-shipment problems.

Assignment problems: maximisation of resources.

Integer programming: relevance of integer variables, Branch & Bound method, Gomory's method of Cutting Planes.

Non-linear programming: non-linearity of objective and constraint functions, method of steepest ascent.

Simulation: basic principles, examples taken from investment appraisal, Queuing Theory and traffic management.

Queuing Theory: single server and multiple server models, Little's formula, Pollaczek-Khintchine formula.

Inventory models: Deterministic and Stochastic Inventory models.

Critical Path Analysis: the method and its use in the management of problems, PERT, Crashing Networks, Gantt Charts.

Heuristic methods: Scheduling problems, Heuristic Thinking.

Software packages: Review of available software, practice in the use of one such package to solve more realistic real-life problems.

Learning Activities

Lectures reinforced by tutorials and computer-laboratory sessions

Notes

Procedures for formulating and solving mathematical programming problems which have business applications are presented.