LIVERPOOL JOHN MOORES UNIVERSITY

Module Proforma

Approved, 2022.05

Summary Information

Module Code	6101MATHS
Formal Module Title	Operational Research
Owning School	Computer Science and Mathematics
Career	Undergraduate
Credits	20
Academic level	FHEQ Level 6
Grading Schema	40

Module Contacts

Module Leader

Contact Name	Applies to all offerings	Offerings
Vincent Kwasnica	Yes	N/A

Module Team Member

Contact Name	Applies to all offerings	Offerings

Partner Module Team

Contact Name	Applies to all offerings	Offerings

Teaching Responsibility

LJMU Schools involved in Delivery
Computer Science and Mathematics

Learning Methods

Learning Method Type	Hours

Lecture	33
Practical	11
Tutorial	11

Module Offering(s)

Offering Code	Location	Start Month	Duration
JAN-CTY	CTY	January	12 Weeks

Aims and Outcomes

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:

Code	Description
MLO1	Apply operations research methods for solution of practical problems.
MLO2	Express operational research analyses in the vernacular (for non-experts).
MLO3	Formulate and solve problems involving operational research.

Module Content

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.

Module Overview

The aim of this module is to examine a wide range of operational research methods and your applicability to real-life problems encountered in business and industry.

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

Assessments

Assignment Category	Assessment Name	Weight	Exam/Test Length (hours)	Learning Outcome Mapping
Centralised Exam	Examination	70	2	MLO3, MLO2, MLO1
Report	Coursework	30	0	MLO1, MLO2, MLO3