BN2291 – OPERATIONAL RESEARCH TECHNIQUES 2

Module Number: BN2291

Module Title: Operational Research Techniques 2

Number of Aston Credits: 10

Total Number of ECTS Credits: 5
(European Credit Transfer)

Staff Member Responsible for the Module:

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Availability: See office hours on door, or make an appointment via email
Group administrator: Mr John Morley, Room 257, Extension 3236

Other Staff Contributing to the Module: To Be Confirmed

Pre-Requisite(s) for the Module:

BN1106 - Business Decision Analysis
BF1114 - Introduction to Management Accounting
BN1160 - Information Technology for Business

Module Learning Outcomes:

The purpose of this module is to present operational research techniques applied to the specific context of operations management and management accounting.

On successful completion of this module students will be able to:

- Understand how to model operations management and management accounting problems using quantitative OR techniques
- Be familiar with various operations management and management accounting problems encountered in today's business world from an analytical perspective
- Develop analytical and computer modelling skills necessary to implement and analyse these problems

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- Develop the ability to identify the analytical challenges of a specific problem, and the ability to identify the appropriate OR technique to solve it
- Effectively solve problems and make decisions
- Have skills in numeracy and quantitative method
- Effective self-management (project)
- Conduct research into business and management issues

Module Content:

Week 1	Simulation Overview of the class; Introduction to simulation models Chapter 13
Week 2	Project Management – Part I Review of project management; CPM and PERT Project monitoring: GANNT charts Chapter 10
Week 3	Project Management – Part II Project Crashing Cost/Time trade-offs; Linear programming applied to project crashing; Project cash flows optimisation Chapter 10
Week 4	Inventory Models – Part I The different types and uses of inventory; Inventory management in management accounting; Basic EOQ model & deterministic model extensions MRP and JIT Chapter 11
Week 5	Inventory Models – Part II ROP under stochastic demand; ROP under stochastic lead times Chapter 11
Week 6	Waiting Line Models – Part I Introduction to waiting line models; Waiting line service systems; Poisson and exponential distributions Chapter 12
Week 7	Waiting Line Models – Part II Single channel models – infinite and finite calling populations Chapter 12
Week 8	Waiting Line Models – Part III Multiple channels models – infinite calling populations; Simulating waiting lines Chapter 12

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Week 9	Production planning and scheduling; Part I, optimal production mix; Review of loading (assignment problems); Chapter 7
Week 10	Production planning and scheduling; Part II, Transportation Notation for Aggregate Planning, job sequencing Chapter 7
Week 11	Advanced Capital Budgeting; multi-attribute decision theory
Week 12	Course Review

International Dimensions:

Problems and Data from international sources are used where appropriate to illustrate the modelling techniques. For example, references to international project management, international issues in inventory management, and international capital budgeting will be discussed.

Corporate Connections:

As this module presents applications of operational research techniques to operations management and management accounting problems, it is rooted in problems faced daily by practitioners. For each topic, the lecture and the tutorial will highlight,

i. Real-life corporate problems, related to planning, costing, waiting lines, etc. and show how these problems can be solved with OR techniques
ii. How specific companies have tackled these problems in practice, either through the presentation of short examples or through case studies

Links to Research:

The Operational Research Techniques relates to many areas of research including but not limited to research in business decision making, multi-criteria decision making, optimisation, spreadsheet modelling, project management, performance assessment, simulation, and inventory modelling.

Learning and Teaching Rationale and Methods:

a) Method of Teaching comprises lectures, tutorials, reading assignments and supporting preparatory work.

b) Duration

Lectures (one hour a week)	12 hours
Tutorials (one hour fortnightly)	5 hours

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Reading	21 hours
Coursework	30 hours
Tutorial preparation	15 hours
Examination preparation	15 hours
Examination	2 hours

Total	**100 hours**

Ethical Approval:

This module does not require any primary research and no ethical approval will be necessary.

Assessment and Feedback Rationale and Methods:

Method of examination is through coursework (40%) and a two-hour examination (60%).

Examination

This assessment, (end of year, two hours long), will test students' understanding of the problems discussed in class and of the methodologies needed to solve them (learning objectives 1 and 2).

Coursework

The coursework consists of one group project assessment which is computer based. It is designed to test the ability of students to identify a problem independently and to solve it with a computer package (learning objectives 3 and 4).

Group Work

For further information on group work please refer to the section, "Advice on Group-Based Activities". In particular, please note:

- Students are advised to bring to the attention of the module lecturer any problems at an early stage

- Students have access to an arbitration system to give them the opportunity to appeal against allocations of marks which they consider to be unfair

- Students are advised to keep records of group meetings in the form of notes to allow for evaluation of contribution and effort

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For coursework submission dates please refer to the notice board on the 6th floor of the Main Building by the coursework hatch or to Blackboard. Failure to complete coursework on time will render a student liable to the late submission penalty applied in the Business School.