

BNM802 SIMULATION FOR MANAGERIAL DECISION MAKING

Academic Year 2013/14

Number of Aston Credits: 15

Number of ECTS Credits: 7.5

Staff Member Responsible for the Module:

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Availability: See 'office hours' on door or email for an appointment
Or contact the Operations & Information Management Group Administrator,
Mr John Morley, ABS 266 Extension: 3236

Pre-requisites for the Module:

None

Module Objectives and Learning Outcomes:

At the end of the course students will be able to use simulation as an aid for decision making.

This module focuses on the modelling of business systems using computer simulation. The students will be required to locate a business problem and build and interpret the results from a simulation model of that problem. Thus this module combines the challenge of learning the theory of simulation modelling in the classroom with the practical challenges of collecting data in an external organisation and working in a group to meet a deadline for the presentation of results.

The module will cover all the steps in undertaking a simulation study including data collection, modelling input data using probability distributions, building a model using the ARENA simulation software and output analysis using confidence intervals.

A student version (v12) of the ARENA simulation software is available at http://highered.mcgraw-hill.com/sites/0073376280/student_view0/arena_software_download.html

Module Content:

- Week 1:** Introduction to Simulation
- Week 2:** Building a Model using the ARENA Visual Interactive Modelling System
- Week 3:** Modelling Input Data
- Week 4:** Validation and Verification
- Week 5:** Experimentation and Analysis
- Week 6:** Implementation of Results
- Week 7:** Presentation of Model Results
- Week 8:** Introducing Simulation in the Organisation
- Week 9:** Revision
- Week 10:** **Examination Week**

Corporate Connections:

The lecturer has conducted a number of consultancy assignments for public and private sector organisations. He draws extensively on this experience during the teaching of this module.

International Dimensions:

By its very nature, the visual aspect of visual interactive simulation makes it a worldwide language. Simulation and forecasting is thus a very attractive technique for multi-national organisations and is used within a range of international consultancy units.

Contribution of Research:

The lecturer has published a number of papers on the subject of simulation in international journals such as the International Journal of Operations and Production Management, Journal of the Operational Research Society and SIMULATION. He is also author of the set text for this module "Simulation Modelling for Business".

Ethics, Responsibility & Sustainability:

The module utilises simulation for application in multi-national organisations. MNCs face issues of ethics, responsibility and sustainability in the global business environment in which they operate.

Method of Teaching:

1.25 hour lecture per week, followed by 0.5 hour break, followed by 1.25 hour tutorial lab session as appropriate.

The ARENA software package will be used in the practical sessions. It is essential that students attend both lectures and practicals in order to understand the subject.

Tutorial material will be provided on Blackboard to create a dynamic learning environment with student hands-on participation in the application of concepts covered.

Method of Assessment:

The module is assessed 100% by coursework

The coursework requires the development (in groups) of a simulation model using ARENA and the submission of an individual report (80%) and the presentation as a group of the study results in week 7 (20%).

Learning Hours:

These should be roughly along the lines indicated below:

Pre-reading	20
Contact Hours	27
Directed Learning (within the contact hours)	13
Private Study/Group Work	90
Total	150

The following readings are subject to change. Students should not therefore purchase textbooks prior to commencing their course. If students wish to undertake background reading before starting the course, many of the chapters/readings are available in electronic form via on-line library catalogues and other resources.

Pre-reading:

Students should read through the essential reading text (Greasley, 2004) in order to understand the process of conducting a simulation study.

Essential Reading:

Simulation Modelling for Business, by A. Greasley (2004), Ashgate Publishing Limited: Aldershot. (available from www.ashgate.com or www.amazon.co.uk)

Indicative Bibliography:

Simulation with ARENA, (5th edition), by W.D. Kelton, R.P. Sadowski, D.T. Sturrock (2009), McGraw-Hill: Maidenhead.

Computer Simulation in Management Science, (5th Edition) by M. Pidd M (2004), John Wiley & Sons: Chichester

Greasley, A. and Assi, A. (2012) "Improving 'last mile' delivery performance to retailers in hub and spoke distribution systems", *Journal of Manufacturing Technology Management*, 23(6), pp. 794-805. ISSN 1741-038X

Greasley, A. (2008) "Using simulation to assess the introduction of technology in a continuous operations process", *Journal of Manufacturing Technology Management*, 19(8), pp. 979-984. ISSN 1741-038X

Greasley, A. (2006) "Using process mapping and business process simulation to support a process-based approach to change in a public sector organisation", *Technovation*, 26(1), pp. 95-103.

Greasley, A. (2005) "Using system dynamics in a discrete-event simulation study of a manufacturing plant", *International Journal of Operations and Production Management*, 25(5/6), pp. 534-548. ISSN 0144-3577.

Useful Electronic Sources:

INSPEC, Compendex, ABI-Inform Full Text (Proquest), Web of Science (Science Citation Index), Emerald.