BN2201 – DATA ANALYSIS AND MODELLING FOR MANAGEMENT

Module	Number:	BN2201
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Module Title: Data Analysis and Modelling for Management

Number of Aston Credits: 10

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

Staff Member Responsible for the Module:

Dr Ozren Despić Operations & Information Management Group

ABS Building, Room 276, Extension 3081, Email: <u>o.despic@aston.ac.uk</u>

Availability: Please see office hours on door or group administrator, John Morley, ABS266, Extension 3236

Other Staff Contributing to the Module:

Dr Leonidas Anastasakis

Operations & Information Management Group

ABS Building, TBA Email: TBA

Availability: Please see office hours on door or group administrator, John Morley, ABS266, Extension 3236

Pre-Requisite(s) for the Module: BN1105 Quantitative Techniques

Module Learning Outcomes:

Upon successful completion of the module students will be able to:

- analyse a large data set using a statistical software and interpret results
- use and apply descriptive stats, hypotheses tests and regression analysis
- apply linear programming (LP) models to mirror business decision
- situations for the purposes of exploring alternative courses of action
- use LP techniques and LP software, to solve business problems and interpret the results generated by the software
- develop decision analysis models and use an appropriate method to recommend a sound business decision
- apply CPM/PERT methods for the purposes of project management

This module should prepare you for the type of quantitative analysis you may encounter in the business school and in life beyond university.

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Module Content:

The module content consists of two parts. Part A (Applied Statistics) is taught over the Weeks 1 to 4 and Part B (Decision Technology) over the Weeks 5 to 10. The detailed information on each part of the module is as follows:

Part A: Applied Statistics (Dr L. Anastasakis)

- Initial data analysis: how to check data and identify errors in a data set
- Parametric hypothesis testing and confidence intervals
- Relationships between variables and linear regression models
- Non parametric test , e.g. Chi-Squared test of Independence

Part B: Decision Technology (Dr O. Despić)

- Mathematical programming: LP models, solutions & sensitivity analysis
- Computer modelling and solutions to LP models
- Transportation, Assignment and Transhipment Problems
- Decision analysis under ignorance, under risk, and under certainty
- Decision Trees and Sequential decision analysis
- Networks: Project Scheduling and Critical Path Analysis: CPM & PERT

International Dimensions:

Data from international sources is used where appropriate.

Corporate Connections:

Where possible, examples are used from a company context.

Links to Research:

The module covers basic principles of mathematical and statistical modelling within a business context. These are all well established principles where the core material is not affected by new research in the area. However, examples of novel applications of these principles within a business context will be briefly discussed in the classroom.

Learning and Teaching Rationale and Methods:

a) There will be 2 hours of lectures and 1 hour practical session per week. Handouts, lecture notes, computer instructions and the data sets for all of the examples will be available through the module folder within the Aston Blackboard. You are expected to work through the examples between lectures to ensure that you understand fully the content of the lectures. Software packages, such as SPSS, Excel and LINDO will be used in the practical sessions. It is essential that you attend both lectures and tutorials.

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b) Composition of learning hours is roughly along the lines shown below:

Contact and directed learning	
Lectures & Tutorials	30 hours
Class Tests & Feedback	2 hours
Examination	2 hours
Indirect learning	
Tutorial preparation	20 hours
Coursework preparation	12 hours
Exam revision	14 hours
Reading	20 hours
Total	100 hours

Ethical Approval:

No ethical approval will be necessary for this module.

Assessment and Feedback Rationale and Methods:

Assessment is via a Case Study to be submitted by noon Friday in Week 5, two Class Tests in Weeks 8 and 11, and an open book Exam in Week 12/13.

Case Study (20%): This is group work relating to the Part A of the module, designed to provide you with experience of analysing a real, large set of data. An essential part of the work is an explanation of the findings of the analysis. Each group will be required to produce a report of their investigation. The groups will consist of about four students and there will, as far as possible, be equal mathematical ability across the groups. Coursework can be submitted at any time during Week 5. However, the absolute deadline for the submission is noon on the Friday of Week 5 and no extension beyond this date is possible.

Class Tests ($2 \times 10\%$): The two class tests in Week 8 and Week 11 will serve you as an opportunity to monitor your learning success and to obtain a very quick feedback relating to the knowledge acquired in Part B of the module.

Final Examination (60%): The examination will test your knowledge from all the three parts of the module. It will take place sometime during Week 12 or 13 – the exact date and time is to be determined by the Undergraduate Office. Students are encouraged to utilise lecturer office hours to obtain more detailed feedback and advice.