The University of Manchester
Alliance Manchester Business School

Courses – September 2017 entry

MSc Business Analytics: Operational Research and Risk Analysis

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Learn the fundamental theories, approaches and analytical toolkits of decision sciences, applied operational research and statistics.

- Apply theories, approaches and the analytical toolkit to common problem areas across the business and management
- Gain a solid theoretical foundation and quantitative skills, alongside practical problem-solving techniques
- Apply your knowledge to real-life scenarios using case studies, individual and team consulting-based assignments, presentations and software tools
- Use SAS Enterprise as part of the 'Data Analytics for Business Decision Making' unit. SAS sponsor a coursework prize for this project
- Choose from a broad range of options to meet your interests or career aspirations
- Prepares you for a career in consultancy, finance, retail, manufacturing, government analytics units, defence, IT systems, outsourcing and telecoms.

(All taught course units are 15 credits)

Semester 1

- **Applied Statistics and Business Forecasting**
  Jim Freeman
  This course unit covers statistical analysis and modelling techniques with an emphasis on multivariate statistical applications in business and business forecasting. The aim of the course is to provide an update on data analysis and statistical hypothesis testing and to introduce multivariate and forecasting techniques.

- **Mathematical Programming and Optimisation**
  Dong-Ling Xu/ Ludmil Mikhailov
  This course covers mathematical modelling, including: linear, non-linear and dynamic programming. Emphasis will be placed on the use of Excel and Solver. The aim is to familiarise students with the application of mathematical programming methods.

One elective unit from:

- **Decision Behaviour, Analysis and Support**
  Nadia Papamichail

  This unit aims to provide a state-of-the-art overview on decision making in a variety of organisational settings (e.g. private, public and not-for-profit sectors). It explores how decision analysis and decision aiding technologies can help individuals, groups and organisations make better decisions. Drawing from decision theory, behavioural and psychological studies, information systems, artificial intelligence, operational research and organisational studies, the course highlights the multi-faceted challenges of decision making. The main emphasis is on prescriptive theories of decision making.

- **IS Strategy and Enterprise Systems**
  Chris Holland
  The aim of the course unit is to develop an understanding of key information systems strategy concepts and contemporary developments in IS strategy for competitive advantage, Internet marketing and global systems. Emphasis will be placed on the combination of theory and practice through the strategic analysis of case studies and examples of big data sets in a range of markets. In lectures and discussion, theory frameworks will be illustrated with international examples and data from banking, telecommunications, grocery, retailing, sports marketing and manufacturing.

- **Social Media and Web Analytics**
  Weigang Wang
  The aim of this course unit is to showcase the opportunities that exist today to leverage the power of the Web and social media; to develop students' expertise in assessing web marketing initiatives, evaluating web optimisation efforts, and measuring user experience; and to equip students with skills to collect, analyse and derive actionable insights from web clickstream, social media chatter, usability testing and experiments. A key feature of this course is the use of hands-on software tools for analysing web and social media interactions.

One elective unit from:

- **Games Businesses Play**
  Luciana Nicollier
  The aim of this elective course unit is to learn the essential tools of game theory, discover their use by applying them to a variety of business situations and cases, and find out which are its limitations. Ultimately, you enhance your ability to think strategically in complex, interactive situations. In particular, it aims at developing your ability to think ahead and to take into account other people's possible responses to your actions.

- **Global Operations Management: Theories and Concepts**
  Antony Potter
  This unit aims to cover issues associated with Operations Management that are not explicitly covered in other parts of the programme. This unit also aims to show how the various topics within the field of Operations Management are integrated in managing operations functions and to provide a view of operations management that encompasses service and manufacturing applications.

- **Managing Projects**
  Eunice Maytorena-Sanchez
  This unit aims to introduce you to the fundamental concepts, processes, tools and techniques employed in project management practice and critically apply and assess these in real-world situations.

- **Supply Chain Logistics Management**
  Antony Paulraj
  This unit provides an overview of the different aspects of supply chain logistics management within the global context. It covers the key concepts within supply chain logistics network design, and the strategic importance of various supply chain logistics decisions including facilities, inventory, and transportation.

  It illustrates the key role that various information and communication technologies play in supply chain logistics, and showcases the cost as well as environmental benefits of sustainable logistics practices such as sustainable warehousing, sustainable transportation, and reverse supply chains.

- **Strategic Supply Chain Management**
  Paul Cousins
  This unit aims to introduce students to the basic issues of supply chain management, provide an understanding of the role of theory within supply chain management and

explore the broad range of activities associated with the sourcing process. The unit provides a foundation for Global SCM.

Semester 2

- **Simulation and Risk Analysis**
  Julia Handl
  This course unit provides an overview of analytics approaches in analysing complex systems. There is particular emphasis on simulation concepts and approaches - spreadsheet-based, discrete-event and system dynamics approaches and software tools. The course will also focus on risk analysis in risk management and basic queuing theory models and operations management concepts in flow management. An introduction to Markov processes will also be covered.

- **Risk, Performance and Decision Analysis**
  Dong-Ling Xu/ Jian-Bo Yang
  This course unit covers risk, performance and decision modelling and analysis, including risk modelling and assessment, both single and multiple criteria decision modelling and analysis, data envelopment analysis and multiple objective optimisation. Emphasis will be placed on the integrated applications of these methods and tools to performance and efficiency analysis and planning. The aim is to familiarise students with the applications of decision modelling and performance analysis methodologies.

- **Data Analytics for Business Decision Making**
  Yu-Wang Chen
  The aim of this course is to provide students with an understanding of data analytics for business decision making. It will discuss a wide range of data analytical techniques, including classification, clustering, predictive modelling, text mining, and visual analytics. Emphasis will be placed on the use of an industry-leading software tool, SAS.

One elective unit from*:

- **Business Improvement Tools and Techniques**

  The course provides an introduction to business improvement tools, techniques and systems. It also provides an understanding of improvement techniques and concepts and process variability. Quality function deployment, failure mode and effects analysis, tools for service improvement, Quality Costing and benchmarking are other areas covered in this course.

- **Global Supply Chain Management**[1]
  Fahian Huq
  This course focuses on building a more detailed knowledge of theory and practical implications of supply chain techniques and strengthens your theoretical understanding of the subject area. The course demonstrates how SCM can be used in practice to create competitive advantage for firms.

- **Information and Knowledge Management**
  Peter Kawalek
  The aim of this elective course unit is to explore growing organisational information and knowledge resources and to identify how they are strategically and operationally managed and exploited effectively within and between organisations. This unit also aims to develop skills in the techniques of information and knowledge management

- **Psychology of Behaviour and Decision Making**
  Oscar de Bruijn
  The emphasis in this course is on descriptive and explanatory theories of human decision making and not on normative and prescriptive theories of how decisions should be made which you will find in other modules. The aims are, therefore, to provide an understanding of the ways in which various factors influence our behaviours and the decisions we make

across a wide range of domains (e.g. financial decisions, consumer behaviour, and interpersonal judgements). How these factors can be used to understand and predict the decisions that people make and how they may be used to facilitate behaviour change (e.g. nudges) are explored in this course. The module encourages you to evaluate critically whether human thinking is rational. It critically examines theories of judgement and decision-making, motivated by research in a wide variety of sub-disciplines including decision sciences, consumer psychology, behavioural economics and the cognitive sciences more generally.

- **Programming in Python for Business Analytics**
  The aim of this unit is to introduce the fundamentals of **Python**, a general-purpose programming language widely used in the application of Data Science, Big Data Analytics and Optimization to business problems. The course provides the skills for implementing your own algorithms as well as using the thousands of Python packages available for data analysis, modelling, inference, simulation, prediction, forecasting, visualisation, optimization and decision support.

  The lab classes provide ample opportunity for you to practice your programming skills and obtain formative feedback. The course is focused on practical knowledge, examples and business applications for data analytics, rather than learning general programming concepts only. The course is very much hands-on with the ultimate goal of turning you into a versatile data analyst for business applications.

- **Operational Excellence: The Toyota Production System**
  Antony Potter
  This course unit provides an overview of the Toyota Way and the Toyota Production System (TPS) and how they improve organisational performance. It enables you to identify how different lean production tools, principles and cultures integrate with each other to develop a sustainable competitive advantage; to use a variety of practical examples to illustrate how to implement and sustain the use of lean thinking within an organisation and to understand how to implement Value Stream Mapping (VSM) within an organisation.

Summer period
Dissertation (60 credits)

- Apply what you have learned in the taught part of the course
- Topics reflect the expertise of lecturers and you may be asked to select from a list of options
- Normally consists of a literature review followed by a piece of work based on qualitative or quantitative research.

Examples of recent dissertation topics include:

- Web analytics for evaluating online user experience
- Capacity management of product test equipment
- Risk management in the hotel industry
- Equity forecasting using ARIMA and neural networks
- Grouping time series via random forests
- Predictive modelling: A case study for selling additional contracts to existing customers in the telecommunications industry

If you have any queries about the course, please contact:

- the admissions office, by telephone on + 44 (0)161 306 1339 or by email to pg.ambs@manchester.ac.uk

Note: This document is prepared in advance of the academic year to which it relates, and some modules and tutors may change before the course begins in September 2017.