

<b>Title</b>	<b>BMAN 70142 Simulation &amp; Risk Analysis</b>
<b>Credit Rating</b>	15
<b>Level</b>	MSc
<b>Semester</b>	2
<b>Course Coordinator(s)</b>	Dr Julia Handl
<b>Methods of Delivery</b>	Lectures / Project workshops
<b>Lecture Hours</b>	30
<b>Seminar Hours</b>	0
<b>Private Study Hours</b>	120 hours
<b>Total Study Hours</b>	150 hours
<b>Pre-requisites</b>	--
<b>Co-requisites</b>	--
<b>Dependant Courses</b>	--
<b>Assessment Methods and Relative Weightings</b>	Coursework project (35% [15% individual management report, 20% team technical report]), team presentation (15%), plus closed-book exam (50%)
<b>Aims</b>	
Analysing systems dominated by randomness and/or interactions or feedback between their constituent elements is particularly challenging. Problems of this type include operational risk analysis, revenue management and improving operational process flow in service or manufacturing. This unit will focus on application of approaches developed to model such systems, including the basics of queuing theory, Markov processes, risk management, and in particular computer-based simulation.	
<b>Learning Outcomes</b>	
At the end of the module students should be familiar with the concepts and types of tools and techniques commonly used in analysing the performance of and risk in complex operational systems. They should be able to consider different approaches and their assumptions, advantages and disadvantages. Students should be able to formulate, use and understand models of problem situations including, where appropriate, state-of-the-art software tools.	
<b>Syllabus</b>	
<ul style="list-style-type: none"> <li>• Overview of analytics approaches in analysing complex systems</li> <li>• Simulation concepts and approaches: spreadsheet-based, discrete-event and system dynamics approaches and software tools</li> <li>• Risk analysis in risk management</li> <li>• Basic queuing theory models and operations management concepts in flow management</li> <li>• Introduction to Markov processes</li> </ul>	
<b>Reading List</b>	
Main texts: <ul style="list-style-type: none"> <li>• Pidd, M. (1998). Computer simulation in Management Science (4<sup>th</sup> ed), Wiley.</li> </ul>	

- Hillier, F. and Lieberman, G.J. (2009), Introduction to operations research (9<sup>th</sup> ed), McGraw-Hill Education.

Supplementary reading:

- Savage, S.L. (2009), The Flaw of Averages, John Wiley & Sons. (ebook available via library)
- Slack, N., Chambers, S., and Johnston, R. (2009), Operations management: principles and practice for strategic impact (6th ed), Pearson Education Limited, Harlow
- Pidd, M. (2009), Tools for thinking (3<sup>rd</sup> ed), John Wiley & Sons, Chichester. (ebook available via library)
- Aven T (2008). Risk analysis: assessing uncertainties beyond expected values and probabilities. John Wiley & Sons: Chichester, UK.
- Aven T (2008). Risk analysis. John Wiley and Sons: Chichester, UK.
- Bedford T and Cooke R (2007). Probabilistic risk analysis: foundations and methods. Cambridge University Press: Cambridge, UK.

Additional background references may be listed with the material for the sessions - these are for interest and to provide more depth for interested students.