

COURSE TITLE: Management Science in Practice		CODE: ST4004
LECTURERS: Prof. Cathal Walsh (Cathal.Walsh@tcd.ie)		
CREDITS: 10	PREREQUISITES: Introduction to Management Science, (Engineering) Mathematics I, II and III.	
TERMS: Semester 1	LECTURES/WEEK: 3	
Duration (weeks): 12	TOTAL HOURS: 44	
<p>MODULE AIMS & OBJECTIVES</p> <p>This course will look into some of the topics covered in the earlier management science courses at greater depth, with emphasis on how the methods can be practically implemented, principally through Excel.</p>		
<p>SYLLABUS</p> <ul style="list-style-type: none"> • Performance Measurement; • Risk Management; • Simulation in complex modelling; • Parametric elicitation; • Supply Chain Management; • Multi-objective, Multi-Criteria decision making; • CPM and PERT analysis • Stochastic linear programming; • Decision theory; • Dynamic programming; • Utility of money; • Futures and options. 		
<p>LEARNING OUTCOMES</p> <p>On successful completion of this course, students will be able to:</p> <ul style="list-style-type: none"> • Implement various management science techniques in Excel, recognising its abilities and limitations; • Identify when an optimisation problem can be solved using dynamic programming and implement the dynamic programming solution; • Demonstrate that decreasing marginal worth leads to risk averse behaviour; • Calculate the risk premium for an given insurance contract and utility of money; • Compare and contrast the properties of futures and options contracts; • Create investment strategies using options based on opinions about price movements over the term of the option; • Identify the impact of correlation between parameters on results of a model; • Quantify the size of monte carlo error having carried out a simulation • list tests that can be carried out on a sequence of random numbers; 		

- Summarise the RAMP procedure;
- Implement a risk review for a capital investment project;
- Generate deviates from an arbitrary pdf.

TEACHING METHODS

Lectures and computer laboratories

ASSESSMENT

Assessment is by written examination. To pass the module, students must achieve an overall mark of 40%.

BIBLIOGRAPHY

- Biswas T, *Decision Making under Uncertainty*, Macmillan (1998).
- Fishman GS, *Discrete Event Simulation, Modeling Programming and Analysis*, Springer Series in Operations Research, Springer (2001).
- Liu JS, *Monte Carlo Strategies in Scientific Computing*, Springer Verlag (2001).
- Lindley DV, *Making Decisions*, Wiley (1971).
- Moore LJ, Lee S, and Taylor BW, *Management Science*, 4th Ed, Allyn and Bacon (1993).
- Morris WT, *Management Science: a Bayesian Introduction*, Prentice Hall (1968).
- Ripley BD, *Stochastic Simulation*, Wiley (1987)
- Vose D, *Risk Analysis, A Quantitative Guide*, Wiley (2000).
- Telford T , *Risk Analysis and Management for Projects* (2002).
- Buchanan R, *An Undergraduate Introduction to Financial Mathematics*, World Scientific Publishing (2006).