Module Code	STU22006
Module Name	Management Science Methods
ECTS Weighting[1]	10 ECTS
Semester taught	Semester 1 & 2
Module Coordinator/s	Paula Roberts
Module Learning Outcomes	On successful completion of this module, students will be able to: LO1. Identify an infeasible problem, a problem with multiple solutions or the presence of degeneracy LO2. Describe how to find an initial basic feasible solution to a linear program LO3. Conduct a parametric analysis on a coefficient in the objective function LO4. Define and formulate a balanced transportation problem LO5. Describe how to solve integer programs with a branch and bound algorithm LO6. Formulate a 0–1 integer program, put into standard form and solve with a branch and bound algorithm LO7. Identify the concepts and terminology involved in Simulation LO8. Describe different kinds of simulation techniques and be familiar with a range of application examples LO9. Apply a simulation using appropriate software LO10. Describe the limitations of Simulation
Module Content	Semester 1 • Formulate and solve Linear and Goal Programming problems using the Simplex Method • Perform Sensitivity Analysis on the output from a Linear and Goal Programming problem • Formulate and solve Transportation, Transhipment and Assignment problems • Formulate a 0 – 1 Linear Programming problem and solve using the Cutting Plane and Branch and Bound Methods • Analyse networks for the Chinese Postman and Travelling Salesman Problems • Other relevant mathematical models Semester 2 • Entities, attributes and variables • Events • Resources • Queues • Steady-state models and transients • Software for simulation • Statistical analysis of output

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[1] TEP Glossary

Teaching and Learning Methods	2 hours lectures in both Semester 1 and 2
	Weekly assignments in Semester 1
	1 hour lab per week for Semester 2

Assessment Details[2]

Assessment Component	Brief Description	Learning Outcomes Addressed	% of total	Week set	Week due
Examination	3 hour written examination	All	80%	n/a	n/a
Test	In-Class Test	LO1,2,3	5%	6	n/a
Test	In-Class Test	LO4,5,6	5%	12	n/a
Assignment	Statistical Software (R) Assignment	LO7,8,9,10	10%	18	22

Reassessment Details

Examination (3 hours, 100%)

Contact Hours and Indicative Student Workload

Contact Hours (scheduled hours per student over full module), broken down by:	60 hours
lecture	44 hours
laboratory	11 hours
tutorial or seminar	5 hours
other	0 hours
Independent study (outside scheduled contact hours), broken down by:	**72 hours**
preparation for classes and review of material (including preparation for examination, if applicable)	36 hours
completion of assessments (including examination, if applicable)	36 hours
Total Hours	**132 hours**

Recommended Reading List

1. J. Banks et al, Discrete-Event System Simulation, Pearson, 5th edition (2010).
2. F. Seila et al, Applied Simulation Modeling, Thompson, 2003.
3. A. M. Law, W.D. Kelton, Simulation Modeling, McGraw-Hill, 3th edition (2000).

Module Pre-requisites

Prerequisite modules: ST1004

Module Co-requisites

Module Website

http://mymodule.tcd.ie

Last Update

08/07/2019 by Paula Roberts