



# STAT279

## Operations Research I

S2 Evening 2019

*Dept of Mathematics and Statistics*

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## General Information

Unit convenor and teaching staff

Lecturer and Unit Convenor

Nino Kordzakhia

[nino.kordzakhia@mq.edu.au](mailto:nino.kordzakhia@mq.edu.au)

Contact via [nino.kordzakhia@mq.edu.au](mailto:nino.kordzakhia@mq.edu.au)

610 Level 6 WW12

TBA

Lecturer

Balamehala Pasupathy

[balamehala.pasupathy@mq.edu.au](mailto:balamehala.pasupathy@mq.edu.au)

Contact via [balamehala.pasupathy@mq.edu.au](mailto:balamehala.pasupathy@mq.edu.au)

Frank Schoenig

[frank.schoenig@mq.edu.au](mailto:frank.schoenig@mq.edu.au)

Credit points

3

Prerequisites

STAT150 or STAT170(P) or STAT171

Corequisites

Co-badged status

Unit description

This unit surveys the field of operations research, which is the practical application of scientific method to the operational, organisational and economic problems of business and industry.

An elementary knowledge of algebra is assumed. Students are expected to use Microsoft Excel to find solutions to formulated problems. Topics are model construction; linear programming; transportation and assignment problems; simulation; network analysis (critical path and PERT); inventory analysis; and waiting line models.

## Important Academic Dates

Information about important academic dates including deadlines for withdrawing from units are available at <https://www.mq.edu.au/study/calendar-of-dates>

## Learning Outcomes

On successful completion of this unit, you will be able to:

Apply mathematical models to business scenarios, and formulate problems

Use a computer package to find solutions to formulated problems

Interpret output and write up conclusions based on the output, in the language of the original problem

## General Assessment Information

### Assignment

In the case when a student is unable to submit the Assignment due to unavoidable circumstances, the student must apply for Special Consideration via <https://ask.mq.edu.au/>

### Late Submission of Work

The Assignments must be submitted by the official due date and time.

**No marks will be given to late work unless an extension has been granted following a successful application for Special Consideration.**

### ELECTRONIC QUIZ

No extensions for Quizzes will be granted except the cases where the application for Special Consideration has already been approved via [ask.mq.edu.au](https://ask.mq.edu.au).

### FINAL EXAMINATION

The final examination will be two hours long.

You are permitted ONE A4 page of paper containing reference material handwritten on both sides. The page will not be returned at the end of the final examination. Calculators will be needed but must not be of the text/programmable type.

You must present yourself for examination at the time and place designated in the University Examination Timetable. The only exception to not sitting an examination at the designated time is because of documented illness or unavoidable disruption. In these circumstances, you may wish to consult the Special Consideration Policy and Procedure

<https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policies/special-consideration>

### Important

If you receive special consideration for the final exam, a supplementary exam will be scheduled in the interval between the regular exam period and the start of the next session. By making a special consideration application for the final exam you are declaring yourself available for a resit during the supplementary examination period and will not be eligible for a second special consideration approval based on pre-existing commitments. Please ensure you are familiar with the policy prior to submitting an application. You can check the supplementary exam information page on FSE101 in *iLearn* ([bit.ly/FSESupp](https://bit.ly/FSESupp)) for dates, and approved applicants will receive an individual notification one week prior to the exam with the exact date and time of their supplementary examination.

## Assessment Tasks

Name	Weighting	Hurdle	Due
<a href="#">Assignment</a>	20%	No	Week 4 and 8
<a href="#">Electronic Quizzes</a>	20%	No	Week 3, 6, 9 and 11
<a href="#">Final Examination</a>	60%	No	University Examination Period

### Assignment

Due: **Week 4 and 8**

Weighting: **20%**

There are 2 Assignments due 9 am Friday in Week 4 and 8 worth 10% each. The Assignments will be available on *iLearn* to download. Students must submit their solutions via *iLearn*.

**For the Assignment conditions see General Assessment Information.**

On successful completion you will be able to:

- Apply mathematical models to business scenarios, and formulate problems
- Use a computer package to find solutions to formulated problems

### Electronic Quizzes

Due: **Week 3, 6, 9 and 11**

Weighting: **20%**

There are 4 Electronic Quizzes, due 9 am Friday in Week 3, 6, 9 and 11 worth 5% each.

The Electronic Quizzes will be available via STAT279 *iLearn* site. The electronic quizzes may be attempted multiple times. A different quiz will be generated for each attempt. The highest score in each quiz will be used in grading.

**For the Electronic Quizzes conditions see General Assessment Information.**

On successful completion you will be able to:

- Apply mathematical models to business scenarios, and formulate problems

### Final Examination

Due: **University Examination Period**

Weighting: **60%**

The timetable will be available in Draft form approximately 8 weeks before the commencement of the examinations and in Final form approximately 4 weeks before the commencement of the examinations at

<https://students.mq.edu.au/study/exams-and-results/exam-timetables>

The Final Examination will be worth 60% of the total unit grade and will cover the whole semester's work.

**For the Final Examination conditions see General Assessment Information.**

On successful completion you will be able to:

- Apply mathematical models to business scenarios, and formulate problems
- Interpret output and write up conclusions based on the output, in the language of the original problem

## Delivery and Resources

### Classes

The Lectures begin in Week 1 and the Practicals begin in Week 2.

Students must attend 3-hours of Lectures and 1-hour of Practical per week.

### Required and Recommended Texts and/or Materials

- Students should download the Study Pack from the unit's *iLearn* site. It includes Lecture slides and Practical material.
- Reference books available in the library include:

1. *Quantitative Decision Making with Spreadsheet Applications* (7th Ed) by Lawrence L. Lapin, William D. Whisler, 2002

(Library Call Number: HD30.23 .L36/2002)

2. *Operations Research Applications and Algorithms* (3d Ed), 1994 by Winston W. L. (PWS Kent)

(Library Call Number: T57.6 .W645/1994)

or *Operations Research* (4th Ed), 2004 by Winston W. L. (Duxbury Press)

3. *Operations Research: An Introduction* (8th edition) 2007 by Hamdy A. Taha (Pearson/Prentice Hall)

(Library Call Number: T57.6 T3 2007)

### Technology Used and Required

#### *Microsoft Excel*

#### **iLearn**

Students can access the *iLearn* page by logging on at <https://ilearn.mq.edu.au>.

Students must log in regularly to read the Announcements and access the teaching material. The assessment tasks will be made available via *iLearn*.

## Teaching and Learning Strategy

Students are strongly recommended to attend the Lectures and one Practical class each week.

Students need to ensure they keep up to date of all assessment tasks.

## Unit Schedule

Week	Lecture topic	Assessment Due
1	Introduction; LP formulation	
2	LP formulation; graphical solution	
3	Solving LPs	Electronic Quiz
4	Sensitivity Analysis	Assignment
5	Simulation	
6	Inventory	Electronic Quiz
7	Project management	
	<b>MID-SESSION BREAK</b>	
8	Project management cont.	Assignment
9	Transportation	Electronic Quiz
10	Transportation cont.	
11	Queuing	Electronic Quiz
12	Revision	
13	Self-study week	

## Learning and Teaching Activities

### LECTURES

During lectures, new models and techniques will be introduced and the students will practice the learnt techniques on example problems.

### PRACTICALS

Practical sessions, in which students solve problems and present their solutions to the class, are compulsory, and attendance will be taken.

## Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central \(https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central\)](https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central). Students should be aware of the following policies in particular with regard to Learning and Teaching:

- [Academic Appeals Policy](#)
- [Academic Integrity Policy](#)
- [Academic Progression Policy](#)
- [Assessment Policy](#)
- [Fitness to Practice Procedure](#)
- [Grade Appeal Policy](#)
- [Complaint Management Procedure for Students and Members of the Public](#)
- [Special Consideration Policy](#) (**Note:** *The Special Consideration Policy is effective from 4 December 2017 and replaces the Disruption to Studies Policy.*)

Undergraduate students seeking more policy resources can visit the [Student Policy Gateway \(https://students.mq.edu.au/support/study/student-policy-gateway\)](https://students.mq.edu.au/support/study/student-policy-gateway). It is your one-stop-shop for the key policies you need to know about throughout your undergraduate student journey.

If you would like to see all the policies relevant to Learning and Teaching visit [Policy Central \(https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central\)](https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central).

## Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: <https://students.mq.edu.au/study/getting-started/student-conduct>

## Results

Results published on platform other than [eStudent](#), (eg. iLearn, Coursera etc.) or released directly by your Unit Convenor, are not confirmed as they are subject to final approval by the University. Once approved, final results will be sent to your student email address and will be made available in [eStudent](#). For more information visit [ask.mq.edu.au](https://ask.mq.edu.au) or if you are a Global MBA

student contact [globalmba.support@mq.edu.au](mailto:globalmba.support@mq.edu.au)

## Student Support

Macquarie University provides a range of support services for students. For details, visit <http://students.mq.edu.au/support/>

## Learning Skills

Learning Skills ([mq.edu.au/learningskills](http://mq.edu.au/learningskills)) provides academic writing resources and study strategies to improve your marks and take control of your study.

- [Workshops](#)
- [StudyWise](#)
- [Academic Integrity Module for Students](#)
- [Ask a Learning Adviser](#)

## Student Services and Support

Students with a disability are encouraged to contact the [Disability Service](#) who can provide appropriate help with any issues that arise during their studies.

## Student Enquiries

For all student enquiries, visit Student Connect at [ask.mq.edu.au](http://ask.mq.edu.au)

If you are a Global MBA student contact [globalmba.support@mq.edu.au](mailto:globalmba.support@mq.edu.au)

## IT Help

For help with University computer systems and technology, visit [http://www.mq.edu.au/about\\_us/offices\\_and\\_units/information\\_technology/help/](http://www.mq.edu.au/about_us/offices_and_units/information_technology/help/).

When using the University's IT, you must adhere to the [Acceptable Use of IT Resources Policy](#). The policy applies to all who connect to the MQ network including students.

## Graduate Capabilities

### Creative and Innovative

Our graduates will also be capable of creative thinking and of creating knowledge. They will be imaginative and open to experience and capable of innovation at work and in the community. We want them to be engaged in applying their critical, creative thinking.

This graduate capability is supported by:

### Learning outcome

- Use a computer package to find solutions to formulated problems

### Assessment task

- Assignment



## Capable of Professional and Personal Judgement and Initiative

We want our graduates to have emotional intelligence and sound interpersonal skills and to demonstrate discernment and common sense in their professional and personal judgement. They will exercise initiative as needed. They will be capable of risk assessment, and be able to handle ambiguity and complexity, enabling them to be adaptable in diverse and changing environments.

This graduate capability is supported by:

### Learning outcome

- Apply mathematical models to business scenarios, and formulate problems

## Commitment to Continuous Learning

Our graduates will have enquiring minds and a literate curiosity which will lead them to pursue knowledge for its own sake. They will continue to pursue learning in their careers and as they participate in the world. They will be capable of reflecting on their experiences and relationships with others and the environment, learning from them, and growing - personally, professionally and socially.

This graduate capability is supported by:

### Learning and teaching activities

- During lectures, new models and techniques will be introduced and the students will practice the learnt techniques on example problems.
- Practical sessions, in which students solve problems and present their solutions to the class, are compulsory, and attendance will be taken.

## Discipline Specific Knowledge and Skills

Our graduates will take with them the intellectual development, depth and breadth of knowledge, scholarly understanding, and specific subject content in their chosen fields to make them competent and confident in their subject or profession. They will be able to demonstrate, where relevant, professional technical competence and meet professional standards. They will be able to articulate the structure of knowledge of their discipline, be able to adapt discipline-specific knowledge to novel situations, and be able to contribute from their discipline to inter-disciplinary solutions to problems.

This graduate capability is supported by:

### Learning outcomes

- Apply mathematical models to business scenarios, and formulate problems
- Interpret output and write up conclusions based on the output, in the language of the original problem

## Assessment task

- Final Examination

## Learning and teaching activity

- During lectures, new models and techniques will be introduced and the students will practice the learnt techniques on example problems.
- Practical sessions, in which students solve problems and present their solutions to the class, are compulsory, and attendance will be taken.

## Critical, Analytical and Integrative Thinking

We want our graduates to be capable of reasoning, questioning and analysing, and to integrate and synthesise learning and knowledge from a range of sources and environments; to be able to critique constraints, assumptions and limitations; to be able to think independently and systemically in relation to scholarly activity, in the workplace, and in the world. We want them to have a level of scientific and information technology literacy.

This graduate capability is supported by:

### Learning outcome

- Interpret output and write up conclusions based on the output, in the language of the original problem

## Problem Solving and Research Capability

Our graduates should be capable of researching; of analysing, and interpreting and assessing data and information in various forms; of drawing connections across fields of knowledge; and they should be able to relate their knowledge to complex situations at work or in the world, in order to diagnose and solve problems. We want them to have the confidence to take the initiative in doing so, within an awareness of their own limitations.

This graduate capability is supported by:

### Learning outcome

- Use a computer package to find solutions to formulated problems

## Assessment task

- Electronic Quizzes

## Effective Communication

We want to develop in our students the ability to communicate and convey their views in forms effective with different audiences. We want our graduates to take with them the capability to read, listen, question, gather and evaluate information resources in a variety of formats, assess, write clearly, speak effectively, and to use visual communication and communication

technologies as appropriate.

This graduate capability is supported by:

### **Learning outcome**

- Apply mathematical models to business scenarios, and formulate problems

### **Learning and teaching activities**

- During lectures, new models and techniques will be introduced and the students will practice the learnt techniques on example problems.
- Practical sessions, in which students solve problems and present their solutions to the class, are compulsory, and attendance will be taken.

### **Changes from Previous Offering**

The Homework has been replaced by additional Assignment in this offering.