STAT279

Operations Research I

S2 Evening 2018

Dept of Statistics

Contents

Disclaimer

Macquarie University has taken all reasonable measures to ensure the information in this publication is accurate and up-to-date. However, the information may change or become out-dated as a result of change in University policies, procedures or rules. The University reserves the right to make changes to any information in this publication without notice. Users of this publication are advised to check the website version of this publication [or the relevant faculty or department] before acting on any information in this publication.

General Information

Unit convenor and teaching staff
Lecturer and Unit Convenor
Nino Kordzakhia
nino.kordzakhia@mq.edu.au
Contact via nino.kordzakhia@mq.edu.au
610 Level 6 WW12
TBA

Karol Binkowski
karol.binkowski@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
HOMEWORK

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

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.

ASSIGNMENT

In the case of **a late submission** of Assignment**,** if no special consideration has been granted, 10% of the earned mark will be deducted for each day that a Tutorial Work, is late, up to a maximum of 50%. After 5 days, counted including weekends and public holidays, a mark of 0% will be awarded. NOTE: It is not the intention of this late penalty policy to cause a student to fail the unit when they have submitted their assignment no more than 5 days after the due date and they would have otherwise passed. In this case, if deductions for late submissions result in the final unit mark for a student being less than 50, when otherwise it would have been 50 or greater, the student's final mark will be exactly 50.

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/

FINAL EXAMINATION

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 supplementary exam period of 17th December to 21st December, 2018. 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) 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
Homework	10%	No	Week 2, 4, 10,12
Electronic Quizzes	10%	No	Week 3, 5, 9, 11
Assignment	20%	No	Week 7
Final Examination	60%	No	University Examination Period

Homework

Due: **Week 2, 4, 10,12**
Weighting: **10%**

There are 4 Homeworks due 9 am Friday in Week 2, 4, 10 and 12 worth 2.5% each. The Homeworks will be available on *iLearn* to download. Students must submit their homework solutions via *iLearn*. The submitted homeworks will be marked.

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

Electronic Quizzes

Due: **Week 3, 5, 9, 11**
Weighting: **10%**

There are 4 Electronic Quizzes, due 9 am Friday in Week 3, 5, 9 and 11 worth 2.5% each.

The electronic quizzes will be available via the web. Links to the Quizzes can be found on the 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

Assignment

Due: **Week 7**
Weighting: **20%**

There will be an individual assignment due 9 am Friday in Week 7, worth 20% of total unit grade. The assignment will be issued 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
- Interpret output and write up conclusions based on the output, in the language of the original problem

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
- 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

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)

or *Quantitative methods for business decisions: with cases* (6th edition) by Lawrence L. Lapin, 1994

(Library Call Number: HD30.23 .L36/1994)

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

Some of the learning and assessment activities will require students to use the spreadsheet application *Excel*.

iLearn Page

STAT279 has an *iLearn* (Online Unit) page, which students can access by logging on at https://ilearn.mq.edu.au.

Students must log in regularly to read the posts and access the teaching material.

Homeworks and other assessment tasks will be made available via iLearn.

Teaching and Learning Strategy

Students must 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	**Homework**
3	Solving LPs	**Electronic Quiz**
4	Sensitivity & advanced formulation	**Homework**
5	Simulation	**Electronic Quiz**
6	Inventory	
7	Project management	**Assignment**
	MID-SESSION BREAK	
8	Project management cont.	
9	Transportation	**Electronic Quiz**
10	Transportation cont.	**Homework**
11	Queuing	**Electronic Quiz**
12	Queuing cont.	**Homework**
13	Overview	

Learning and Teaching Activities

Lectures

The Lectures start in Week 1. During lectures new models and techniques will be introduced and students practice the techniques on example problems.

Practicals

The Practicals start in Week 2. Practical sessions in which students solve problems and present their solutions to the class. These sessions 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). 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). 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).

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 shown in *iLearn*, 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.

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) 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

IT Help

For help with University computer systems and technology, visit 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

- Apply mathematical models to business scenarios, and formulate problems

Assessment tasks

- Homework
- Assignment
- Final Examination

Learning and teaching activities

- The Lectures start in Week 1. During lectures new models and techniques will be

introduced and students practice the techniques on example problems.

- The Practicals start in Week 2. Practical sessions in which students solve problems and present their solutions to the class. These sessions are compulsory, and attendance will be taken.

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

Assessment tasks

- Homework
- Electronic Quizzes
- Assignment
- Final Examination

Learning and teaching activities

- The Lectures start in Week 1. During lectures new models and techniques will be introduced and students practice the techniques on example problems.
- The Practicals start in Week 2. Practical sessions in which students solve problems and present their solutions to the class. These sessions are compulsory, and attendance will be taken.

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:

Assessment tasks

- Homework
- Assignment

Learning and teaching activities

- The Lectures start in Week 1. During lectures new models and techniques will be introduced and students practice the techniques on example problems.
- The Practicals start in Week 2. Practical sessions in which students solve problems and present their solutions to the class. These sessions 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
- 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

Assessment tasks

- Homework
- Electronic Quizzes
- Assignment
- Final Examination

Learning and teaching activities

- The Lectures start in Week 1. During lectures new models and techniques will be introduced and students practice the techniques on example problems.
- The Practicals start in Week 2. Practical sessions in which students solve problems and present their solutions to the class. These sessions 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 outcomes

- 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

Assessment tasks

- Homework
- Electronic Quizzes
- Assignment
- Final Examination

Learning and teaching activities

- The Lectures start in Week 1. During lectures new models and techniques will be introduced and students practice the techniques on example problems.
- The Practicals start in Week 2. Practical sessions in which students solve problems and present their solutions to the class. These sessions are compulsory, and attendance will be taken.

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 outcomes

- 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

Assessment tasks

- Homework

- Electronic Quizzes

- Assignment

- Final Examination

Learning and teaching activities

- The Lectures start in Week 1. During lectures new models and techniques will be introduced and students practice the techniques on example problems.

- The Practicals start in Week 2. Practical sessions in which students solve problems and present their solutions to the class. These sessions are compulsory, and attendance will be taken.

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 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 tasks

- Homework

- Assignment

- Final Examination

Learning and teaching activities

- The Lectures start in Week 1. During lectures new models and techniques will be introduced and students practice the techniques on example problems.

- The Practicals start in Week 2. Practical sessions in which students solve problems and present their solutions to the class. These sessions are compulsory, and attendance will be taken.

Changes from Previous Offering

In this offering the Homeworks will be marked in due course.