STAT279

Operations Research I

S1 Day 2019

Dept of Mathematics and Statistics

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General Information

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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

LATE SUBMISSION OF WORK:

All assignments and assessment tasks must be submitted by its due date and time.

No marks will be given for late submission or work unless an extension has been granted following a successful application for Special Consideration via ask.mq.edu.au. Please contact the unit convenor for advice as soon as you become aware that you may have difficulty meeting any of the assessment (eg, assignment) deadlines.

FINAL EXAM POLICY: You are advised that it is Macquarie University policy not to set early examinations for individuals or groups of students. All students are expected to ensure that they are available until the end of the teaching semester, that is, the final day of the official examination period. The only excuse for not sitting an examination at the designated time is because of documented illness or unavoidable disruption. In these special circumstances, you may apply for special consideration via ask.mq.edu.au.

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) 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	8%	No	Week 2, 4, 10,12
Online Quizzes	12%	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: **8%**

There are four (4) Homeworks (2% each) due in the practical classes in Week 2, 4, 10 and 12, respectively. The Homeworks will be available on *iLearn* for downloading. Students must get their homework solutions checked by the Instructor of the Practical classes in those weeks.

For late submission of any Homework, please refer to the information under General Assessment Information section in this unit guide.

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Online Quizzes

Due: **Week 3, 5, 9, 11**
Weighting: **12%**

There are 4 Online Quizzes (3% each) due by 9 am Friday in Week 3, 5, 9 and 11.

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

For information related to missing any quizes, please refer to the General Assessment Information section in this unit guide.

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 by 12pm (noon) Friday in Week 7. The assignment will be made available on *iLearn* after Week 4.

For late submission, please refer to the information under General Assessment Information section in this unit guide.

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%**

There will be a two-hour written examination that will be timetabled within the official University Examination Timetable. The University Examination Timetable will be available in draft form approximately eight weeks before the commencement of the the University examinations and in final form approximately four weeks before the commencement of the examinations at:

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

The only excuse for not sitting an examination at the designated time is because of documented illness or unavoidable disruption. In these special circumstances you may apply for Special Consideration via ask.mq.edu.au.

For more information about Special Consideration and/or Supplementary Examination, please refer to the information under General Assessment Information section in this unit guide.

On successful completion you will be able to:

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Delivery and Resources

Classes

Students are required to attend one 3-hour lecture per week **beginning in Week 1**, and one 1-hour practical **beginning in Week 2**.

Times and locations for all classes can be found on the University web site at: www.timetables.mq.edu.au. In the case of changing classes, time and/or location, you will be informed at the lecture and/or on the unit iLearn in advance.

Note: You are welcome to come to see the lecturer during staff consultation time with questions related to the unit. You could also contact the lecturer by email. Only the **Macquarie University student email accounts** may be used to communicate with staff.

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 materials.

- 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 in this unit will require students to use the spreadsheet application, *Excel*.

Calculator: An electronic calculator is required throughout this unit. Only calculators with no text retrieval capacity are permitted to be used in the examination.

Unit Web Page and iLearn Access: The unit web page is available on iLearn and can be accessed at https://ilearn.mq.edu.au under 'STAT279 Operation Research I' link. **Note** that students must visit this web site regularly for course materials including Study Pack, Homeworks and solutions, Assignment and its solution, other coursework assessment tasks, lecture recordings (ECHO360) and possible announcements placed by the Lecturer. The **Discussion Forum** on the unit **iLearn** can be used for online discussion with other students enrolled in STAT279 on any problems or topics related to the unit. The lecturer(s) will visit the Forum from time to time.

Learning and Teaching activities

Lectures:

Lectures begin in **Week 1**. Students are required to attend one 3-hour lecture each week. Topic(s) for each week are set in the Unit Schedule within this unit guide. Students are encouraged to read relevant lecture notes in STAT279 Study Pack before coming to the lecture.

An iLecture will be recorded for each lecture **when possible** and made available on the unit iLearn (under echo360) soon after the lecture is completed.

Practicals:

A set of practical exercises will be made available each week for students to practice, which is presented under the relevant iLearn section. Students are required to participate in one 1-hour practical class per week **from Week 2,** in which students solve problems and present their solutions to the practical class of the following week. Students are also encouraged to attempt relevant practical exercises before going to their practical class.

Unit Schedule

Week	Lecture topic	Assessment Due
1	Introduction; Linear Programming (LP) formulation	
2	LP formulation; graphical solution	**Homework 1**
3	Solving LPs	**Quiz 1**
4	Sensitivity & advanced formulation	**Homework 2**
5	Simulation	**Quiz 2**
6	Inventory	
7	Project management	**Assignment**
	MID-SESSION BREAK	
8	Project management (Cont.)	
9	Transportation	**Quiz 3**
10	Transportation (Cont.)	**Homework 3**
11	Queuing	**Quiz 4**
12	Queuing (Cont.)	**Homework 4**
13	Revision (self study)	

Policies and Procedures

Macquarie University policies and procedures are accessible from Policy Central (https://staff.m

q.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 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 or if you are a Global MBA student contact 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) 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

If you are a Global MBA student contact 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/.

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

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
- Online Quizzes
- Assignment
- Final Examination

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

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
- Online Quizzes

- Assignment
- Final Examination

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:

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Assessment tasks

- Homework
- Online Quizzes
- Assignment
- Final Examination

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

Assessment tasks

- Homework
- Online Quizzes
- Assignment
- Final Examination

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

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

Assessment tasks

- Homework
- Assignment
- Final Examination