Disclaimer
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Notice
Some on-campus classes have moved online for the first two weeks of Session, before returning to campus in Week 3. If you are studying a unit outside of the primary Session 2 timetable, please contact your teaching staff team for further details.

Some classes/teaching activities cannot be moved online and must be taught on campus. To find out if you are enrolled in one of these classes/teaching activities, you can check to see if your unit is on the list of units with mandatory on-campus classes/teaching activities.

Your Unit Convenor will provide more information via an iLearn announcement when your iLearn unit becomes available.
## General Information

| Unit convenor and teaching staff |  |
|----------------------------------|  |
| Unit Convenor                   | Maggie Lee |
| Maggie Lee                      | maggie.lee@mq.edu.au |

| Lecturer                        |  |
|---------------------------------| Pavel Shevchenko |
| Pavel Shevchenko                | pavel.shevchenko@mq.edu.au |

| Credit points                   |  |
|---------------------------------| 10 |

| Prerequisites                   | Admission to MRes |
|---------------------------------|  |
| Corequisites                     |  |

| Co-badged status                |  |
|---------------------------------|  |
| Unit description                |  |
| This unit covers advanced tools and techniques in data analytics and modern applied research. Students will be taught how to apply these skills in a range of business environments and will be able to contribute to all stages of developing solutions to analytical problems across multiple industries, domains and research contexts. This unit has a focus on practical application using a variety of real-life case studies. Students gaining a grade of credit or higher in this unit are eligible for exemption from the Data Analytics Principles subject of the Actuary program of the Actuaries Institute. |

## Important Academic Dates

Information about important academic dates including deadlines for withdrawing from units are available at [https://students.mq.edu.au/important-dates](https://students.mq.edu.au/important-dates)

## Learning Outcomes

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

- **ULO1**: Explain the key iterative steps involved in building a model (business understanding, data understanding and preparation, modelling, evaluation, communication and deployment).
- **ULO2**: Describe the various stages in data understanding and preparation and apply
these skills within the context of practical problems.

**ULO3:** Compare predictive modelling techniques to select an appropriate method for a stated situation and perform predictive modelling for a given set of data.

**ULO4:** Use a range of perspectives (statistical techniques and measures, business context and objectives etc.) to evaluate the appropriateness of a model.

**ULO5:** Communicate modelling results to a range of business decision making audiences, taking into account the audience’s needs and relating findings back to the original business objectives.

**ULO6:** Develop solutions to analytical problems in research contexts.

**General Assessment Information**

Assessment criteria for all assessment tasks will be provided on the unit iLearn site.

It is the responsibility of students to view their marks for each within-session-assessment on iLearn within 20 days of posting. If there are any discrepancies, students must contact the unit convenor immediately. Failure to do so will mean that queries received after the release of final results regarding assessment tasks (not including the final exam mark) will not be addressed.

**Late submissions of assessments**

Sometimes unavoidable circumstances occur that might prevent you from submitting an assessment on time and, in that case, you may be eligible to lodge a **Special Consideration request**.

Unless a **Special Consideration request** has been submitted and approved, please note that no extensions to assessment deadlines will be granted. Assessments that are submitted late will attract a late penalty:

1. There will be a deduction of 10% of the total available marks for each 24 hour period or part thereof that the submission is late.
2. No assessment will be accepted more than 72 hours after the original due date and time (incl. weekends).
3. No late submissions will be accepted for timed assessments (e.g., quizzes, online tests) or for tasks with a weighting of 10% or less.

**Assessment Tasks**

<table>
<thead>
<tr>
<th>Name</th>
<th>Weighting</th>
<th>Hurdle</th>
<th>Due</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research report</td>
<td>20%</td>
<td>No</td>
<td>Week 7 - See iLearn for details</td>
</tr>
<tr>
<td>Case Studies</td>
<td>20%</td>
<td>No</td>
<td>Week 12 - See iLearn for details</td>
</tr>
<tr>
<td>Final Exam</td>
<td>60%</td>
<td>No</td>
<td>University Examination Period</td>
</tr>
</tbody>
</table>
Research report

Assessment Type 1: Report
Indicative Time on Task 2: 20 hours
Due: Week 7 - See iLearn for details
Weighting: 20%

Students will be required to write up a report (word limit of up to 5000 words) based on a project.

On successful completion you will be able to:
  • Explain the key iterative steps involved in building a model (business understanding, data understanding and preparation, modelling, evaluation, communication and deployment).
  • Describe the various stages in data understanding and preparation and apply these skills within the context of practical problems.
  • Compare predictive modelling techniques to select an appropriate method for a stated situation and perform predictive modelling for a given set of data.
  • Use a range of perspectives (statistical techniques and measures, business context and objectives etc.) to evaluate the appropriateness of a model.
  • Communicate modelling results to a range of business decision making audiences, taking into account the audience's needs and relating findings back to the original business objectives.
  • Develop solutions to analytical problems in research contexts.

Case Studies

Assessment Type 1: Case study/analysis
Indicative Time on Task 2: 20 hours
Due: Week 12 - See iLearn for details
Weighting: 20%

Students will work on two individual case studies.

On successful completion you will be able to:
  • Explain the key iterative steps involved in building a model (business understanding, data understanding and preparation, modelling, evaluation, communication and deployment).
  • Describe the various stages in data understanding and preparation and apply these skills within the context of practical problems.
  • Compare predictive modelling techniques to select an appropriate method for a stated
situation and perform predictive modelling for a given set of data.

- Use a range of perspectives (statistical techniques and measures, business context and objectives etc.) to evaluate the appropriateness of a model.
- Communicate modelling results to a range of business decision making audiences, taking into account the audience's needs and relating findings back to the original business objectives.

Final Exam

Assessment Type 1: Examination
Indicative Time on Task 2: 28 hours
Due: University Examination Period
Weighting: 60%

The final examination will be closed book, a three-hour written paper with ten minutes reading time, to be held during the University Examination period.

On successful completion you will be able to:

- Explain the key iterative steps involved in building a model (business understanding, data understanding and preparation, modelling, evaluation, communication and deployment).
- Describe the various stages in data understanding and preparation and apply these skills within the context of practical problems.
- Compare predictive modelling techniques to select an appropriate method for a stated situation and perform predictive modelling for a given set of data.
- Use a range of perspectives (statistical techniques and measures, business context and objectives etc.) to evaluate the appropriateness of a model.
- Communicate modelling results to a range of business decision making audiences, taking into account the audience's needs and relating findings back to the original business objectives.

1 If you need help with your assignment, please contact:

- the academic teaching staff in your unit for guidance in understanding or completing this type of assessment
- the Learning Skills Unit for academic skills support.

2 Indicative time-on-task is an estimate of the time required for completion of the assessment task and is subject to individual variation
Delivery and Resources

Classes
ACST7095 is offered via classes on North Ryde campus (Macquarie University). Students share lecture classes and a common teaching website with the units ACST8095 and ACST4005.

Downloadable lecture recordings
In all weeks, standard recordings of campus lectures using the University's lecture recording facility (ECHO360 or zoom) will be available. The recordings capture audio and screenshot. The recordings will either be provided via the ECHO360 link which is located on the right hand side of the webpage or via a zoom link.

Timetable
The timetable for classes can be found on the Macquarie University website at: http://www.timetables.mq.edu.au

Alterations to the class times or locations will be advised in class and on the teaching website.

Teaching staff
Maggie Lee is the unit convenor and will be taking five weeks of classes. Maggie can be contacted via Dialogue on the website, or during her consultation hours.

Professor Pavel Shevchenko will be taking the other weeks of classes. Pavel can be contacted via Dialogue on the website, or during his consultation hours.

Hong Xie is the teaching administrator, and can deal with any administrative queries related to the unit. Hong can be contacted via Dialogue on the website.

Assumed knowledge
We assume from the start of the Actuarial Data Analytics that you have acquired the knowledge and skills in subjects from the Foundation Program (Part 1s) of the Actuaries Institute education program.

Lecture slides/Learning Guide
There will be Lecture Slides and/or Learning Guides and associated readings for each section of work. You should read these materials in advance of the lectures, and bring a copy with you to classes.

Technology Used and Required
In this unit, you will need to have access to and to be able to use software to code (R and R studio) and word-processing software to produce reports.

Teaching Website
Course material is available on the online learning management system (iLearn). The teaching website is integral to this unit. Passive involvement in this unit greatly reduces the likelihood of achieving the exemption standard of understanding. Interaction with other students and with
teachers is very important, and the website is the forum for that interaction. You will need to be accessing the website regularly to see announcements, read postings and stay informed - at least every couple of days. This is your responsibility and we cannot make any allowances for students who miss important information due to not checking the website regularly. The website entry page is at: http://ilearn.mq.edu.au

**Teaching and Learning Activities**

The unit is taught as set out in the Classes section. The Unit Schedule sets out the assessment and the topics covered in each week of the session.

**Exemptions**

The Macquarie University unit ACST4005/ACST7095/ACST8095 will satisfy the requirements for exemption from the Data Analytics Principles subject of the Actuary program of the Actuaries Institute. You will be recommended for exemption if you attain grades of Credit or better in this unit. It is the responsibility of the student to apply to Macquarie University to recommend them to the Actuaries Institute for professional exemptions. For information about this process please contact Hong Xie via iLearn.

**Unit Schedule**

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<thead>
<tr>
<th>Week</th>
<th>Week beginning</th>
<th>Topic</th>
<th>Lecturer</th>
<th>Assessment task</th>
<th>Notes</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>26-Jul</td>
<td>Business Environment</td>
<td>ML</td>
<td></td>
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</tr>
<tr>
<td>2</td>
<td>02-Aug</td>
<td>Communication</td>
<td>ML</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>09-Aug</td>
<td>Data exploration</td>
<td>ML</td>
<td></td>
<td></td>
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<tr>
<td>4</td>
<td>16-Aug</td>
<td>Data quality</td>
<td>ML</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>23-Aug</td>
<td>Data manipulation and cleansing</td>
<td>ML</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>30-Aug</td>
<td>Basic Concepts and Linear Regression</td>
<td>PS</td>
<td></td>
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</tr>
<tr>
<td>7</td>
<td>06-Sep</td>
<td>Linear Regression II</td>
<td>PS</td>
<td>Project/Research report</td>
<td></td>
</tr>
<tr>
<td>Break</td>
<td>13-Sep</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Break</td>
<td>20-Sep</td>
<td></td>
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<tr>
<td>8</td>
<td>27-Sep</td>
<td>Model Selection</td>
<td>PS</td>
<td></td>
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<tr>
<td>9</td>
<td>04-Oct</td>
<td>GLM (Poisson Regression), clustering</td>
<td>PS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>11-Oct</td>
<td>Regression Tree methods</td>
<td>PS</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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.)

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/admin/other-resources/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://stu
Learning Skills

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

- Getting help with your assignment
- Workshops
- StudyWise
- Academic Integrity Module

The Library provides online and face to face support to help you find and use relevant information resources.

- Subject and Research Guides
- Ask a Librarian

Student Enquiry Service

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

Equity 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.

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.