BUS3020
Advanced Analytics Techniques
Session 1, In person-scheduled-weekday, North Ryde 2024

Department of Actuarial Studies and Business Analytics

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General Information

Unit convenor and teaching staff
George Milunovich
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Credit points
10

Prerequisites
(STAT270 or STAT2170) and (MGMT220 or BUSA2020)

Corequisites

Co-badged status

Unit description
This is an advanced applied-skills unit which extends concepts and analytical techniques from earlier units. Students will use data to create graphical representations of data for analysis. Students will clean data in commonly-used spreadsheet formats and make extensive use of proprietary software from big-data orientated companies. Students will develop skills in data visualisation that can be applied to competitive behaviour, target customer analysis, criminology and security intelligence problems.

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:

ULO1: Develop sound solutions to a range of business problems using an analytical approach.
ULO2: Demonstrate competence in applying basic forecasting techniques to a range of business issues.
ULO3: Apply critical thinking to strategy in analysing firm behaviour.
ULO4: Analyse contemporary challenges commonly facing business organisations and how to respond to them.
ULO5: Successfully work in teams to achieve group and organizational objectives
## Assessment Tasks

<table>
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<tr>
<th>Name</th>
<th>Weighting</th>
<th>Hurdle</th>
<th>Due</th>
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<tr>
<td>Clustering &amp; Segmentation</td>
<td>15%</td>
<td>No</td>
<td>Week 11</td>
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<tr>
<td>Predictive Analytics and dealing with messy data</td>
<td>15%</td>
<td>No</td>
<td>Week 7</td>
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<tr>
<td>Final Exam</td>
<td>40%</td>
<td>No</td>
<td>Official Exam Period</td>
</tr>
<tr>
<td>Group Project</td>
<td>30%</td>
<td>No</td>
<td>Week 13</td>
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### Clustering & Segmentation

**Assessment Type**: Practice-based task  
**Indicative Time on Task**: 15 hours  
**Due**: Week 11  
**Weighting**: 15%

Applying appropriate clustering techniques to find meaningful groups and make business recommendations based on the found relationship.

On successful completion you will be able to:
- Demonstrate competence in applying basic forecasting techniques to a range of business issues.
- Apply critical thinking to strategy in analysing firm behaviour.
- Analyse contemporary challenges commonly facing business organisations and how to respond to them.

### Predictive Analytics and dealing with messy data

**Assessment Type**: Practice-based task  
**Indicative Time on Task**: 20 hours  
**Due**: Week 7  
**Weighting**: 15%

1) Implementing multiple predictive models to forecast a target variable. Comparing and contrasting forecasting performances.
2) Data cleaning, encoding ordinal and nominal variable, and dealing with missing values. Making forecasts based on messy datasets.

On successful completion you will be able to:

- Develop sound solutions to a range of business problems using an analytical approach.
- Demonstrate competence in applying basic forecasting techniques to a range of business issues.
- Apply critical thinking to strategy in analysing firm behaviour.
- Analyse contemporary challenges commonly facing business organisations and how to respond to them.

Final Exam
Assessment Type 1: Examination
Indicative Time on Task 2: 20 hours
Due: Official Exam Period
Weighting: 40%

A final exam to be held during exam period.

On successful completion you will be able to:

- Demonstrate competence in applying basic forecasting techniques to a range of business issues.
- Apply critical thinking to strategy in analysing firm behaviour.
- Analyse contemporary challenges commonly facing business organisations and how to respond to them.

Group Project
Assessment Type 1: Report
Indicative Time on Task 2: 30 hours
Due: Week 13
Weighting: 30%

Data wrangling and Predictive analysis: Group will work together on an allocated project/case and submit python code, recorded video explanations of their solutions and a written group report.
On successful completion you will be able to:

- Develop sound solutions to a range of business problems using an analytical approach.
- Apply critical thinking to strategy in analysing firm behaviour.
- Analyse contemporary challenges commonly facing business organisations and how to respond to them.
- Successfully work in teams to achieve group and organizational 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 Writing Centre 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**

- Number and length of classes: 3 hours face-to-face teaching per week, consisting of 1 x 2 hour lecture and 1 x 1 hour tutorial.

**Recommended Textbook**

- *Python Machine Learning* (Third Edition) by Raschka and Mirjalili

**Technology Used and Required**

- You will need a decent quality laptop
- Students will use Python and Jupyter Lab

**Unit Schedule**

Available on iLearn.

**Policies and Procedures**

Macquarie University policies and procedures are accessible from Policy Central ([https://policies.mq.edu.au](https://policies.mq.edu.au)). Students should be aware of the following policies in particular with regard to Learning and Teaching:
Students seeking more policy resources can visit Student Policies (https://students.mq.edu.au/support/study/policies). It is your one-stop-shop for the key policies you need to know about throughout your undergraduate student journey.

To find other policies relating to Teaching and Learning, visit Policy Central (https://policies.mq.edu.au) and use the search tool.

**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

**Academic Integrity**

At Macquarie, we believe academic integrity – honesty, respect, trust, responsibility, fairness and courage – is at the core of learning, teaching and research. We recognise that meeting the expectations required to complete your assessments can be challenging. So, we offer you a range of resources and services to help you reach your potential, including free online writing and maths support, academic skills development and wellbeing consultations.

**Student Support**

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

**The Writing Centre**

The Writing Centre provides resources to develop your English language proficiency, academic writing, and communication skills.

- Workshops
- Chat with a WriteWISE peer writing leader
• Access StudyWISE
• Upload an assignment to Studiosity
• Complete the 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 Services and Support
Macquarie University offers a range of Student Support Services including:

• IT Support
• Accessibility and disability support with study
• Mental health support
• Safety support to respond to bullying, harassment, sexual harassment and sexual assault
• Social support including information about finances, tenancy and legal issues
• Student Advocacy provides independent advice on MQ policies, procedures, and processes

Student Enquiries
Got a question? Ask us via AskMQ, or contact Service Connect.

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.

Unit information based on version 2024.04 of the Handbook