



BUSA3020

Advanced Analytics Techniques

Session 2, In person-scheduled-weekday, North Ryde 2026

Department of Actuarial Studies and Business Analytics

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General Information

Unit convenor and teaching staff George Milunovich george.milunovich@mq.edu.au
Credit points 10
Prerequisites (STAT2170 or STAT2372) and BUSA2020
Corequisites
Co-badged status
Unit description This is an advanced-level unit that builds on concepts and analytical techniques introduced in earlier units. Students will clean and manipulate data in commonly used tabular formats and make extensive use of Python and its associated open-source libraries. They will create graphical representations for data analysis and develop predictive models to forecast a variety of business applications, such as credit card and mortgage defaults, house prices, used car values, etc. The unit also covers analytics techniques such as clustering techniques for customer segmentation, and text analysis for sentiment and topic modelling.

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:** Apply analytical techniques to develop practical solutions for defined business problems using appropriate data and tools.
- ULO2:** Select and implement basic forecasting methods to address structured business scenarios, interpreting results to inform decision-making.
- ULO3:** Examine analytical algorithms to solve defined business problems, describing their assumptions, logic, and outputs.
- ULO4:** Demonstrate understanding of key analytical techniques and apply appropriate methods to analyse defined problems.

ULO5: Collaborate effectively in teams to achieve shared goals, demonstrating accountability and communication in a business context.

General Assessment Information

Late Submission Penalties

If you submit your assessment late, 5% of the total possible marks will be deducted for each day (including weekends), up to 7 days. Submissions more than 7 days late will receive a mark of 0.

Example 1 (out of 100):

- If you score 85/100 but submit **20 hours late**, you will lose **5 marks** and receive **80/100**.

Example 2 (out of 30):

- If you score 27/30 but submit **20 hours late**, you will lose **1.5 marks** and receive **25.5/30**.

Assessment Tasks

Name	Weighting	Hurdle	Due	Groupwork/Individual	Short Extension	AI Approach
Professional practice: Modelling analysis	30%	No	28/08/2026	Individual	Yes	Open AI
Professional practice: Modelling task analysis	30%	No	23/10/2026	Group	No	Open AI
Formal examination	40%	No	University Examination Period	Individual	No	Observed

Professional practice: Modelling analysis

Assessment Type ¹: Professional task

Indicative Time on Task ²: 15 hours

Due: **28/08/2026**

Weighting: **30%**

Groupwork/Individual: Individual

Short extension ³: Yes

AI Approach: Open AI

The purpose of this assessment is for you to develop your ability to tackle challenging predictive tasks and deliver sophisticated solutions using Python, in line with industry standards.

You will work with a messy dataset, clean the data, develop predictive models, and implement

them in Python to produce accurate forecasts and submit a brief discussion of your results.

Skills in focus:

- Digital skills
- Critical thinking and problem solving
- Work readiness
- Discipline knowledge

Deliverable(s): Modelling task.

Individual assessment

On successful completion you will be able to:

- Apply analytical techniques to develop practical solutions for defined business problems using appropriate data and tools.
- Select and implement basic forecasting methods to address structured business scenarios, interpreting results to inform decision-making.
- Examine analytical algorithms to solve defined business problems, describing their assumptions, logic, and outputs.
- Demonstrate understanding of key analytical techniques and apply appropriate methods to analyse defined problems.

Professional practice: Modelling task analysis

Assessment Type ¹: Professional task

Indicative Time on Task ²: 25 hours

Due: **23/10/2026**

Weighting: **30%**

Groupwork/Individual: Group

Short extension ³: No

AI Approach: Open AI

The purpose of this assessment is for you to develop your ability to tackle challenging predictive tasks and deliver sophisticated solutions using Python, in line with industry standards.

You will work with your peers in a group and propose an analytics-based solution for a business problem, and implement it in Python code by cleaning the data, developing discussing the proposed solution.

Skills in focus:

- Discipline knowledge
- Digital skills
- Critical thinking and problem solving

- Work readiness
- Collaboration skills

Deliverable(s): Modelling task.

Group assessment

On successful completion you will be able to:

- Apply analytical techniques to develop practical solutions for defined business problems using appropriate data and tools.
- Select and implement basic forecasting methods to address structured business scenarios, interpreting results to inform decision-making.
- Examine analytical algorithms to solve defined business problems, describing their assumptions, logic, and outputs.
- Demonstrate understanding of key analytical techniques and apply appropriate methods to analyse defined problems.
- Collaborate effectively in teams to achieve shared goals, demonstrating accountability and communication in a business context.

Formal examination

Assessment Type ¹: Examination

Indicative Time on Task ²: 30 hours

Due: **University Examination Period**

Weighting: **40%**

Groupwork/Individual: Individual

Short extension ³: No

AI Approach: Observed

The purpose of this assessment is for you to formally demonstrate the expertise you have gained in this unit.

You will participate in a 2-hour exam with 10 minutes reading time, held during the University Examination period. Important information about the exam will be made available on the unit iLearn page. You should also review the [MQ Exams website](#) for general tips.

Deliverable(s): Formal exam

Individual assessment

On successful completion you will be able to:

- Apply analytical techniques to develop practical solutions for defined business problems using appropriate data and tools.
- Select and implement basic forecasting methods to address structured business

scenarios, interpreting results to inform decision-making.

- Examine analytical algorithms to solve defined business problems, describing their assumptions, logic, and outputs.
- Demonstrate understanding of key analytical techniques and apply appropriate methods to analyse defined problems.

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
- [Academic Success](#) 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.

³ An automatic short extension is available for some assessments. Apply through the [Service Connect Portal](#).

Delivery and Resources

Classes

- **Number and length of classes:** 3 hours of face-to-face teaching per week, consisting of:
 - One 2-hour lecture
 - One 1-hour computer lab/tutorial

Recommended Textbook

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

Technology Used and Required

- You will need a decent-quality laptop.
- A tablet is **not sufficient**, as you will be required to run Python and related software during labs and tutorials.

Unit Schedule

See iLearn for details.

Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central \(https://policies.s.mq.edu.au\)](https://policies.s.mq.edu.au). 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](#)
- [Assessment Procedure](#)
- [Complaints Resolution Procedure for Students and Members of the Public](#)
- [Special Consideration Policy](#)

Students seeking more policy resources can visit [Student Policies](https://students.mq.edu.au/support/study/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) (<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 connect.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/>

Academic Success

[Academic Success](#) provides resources to develop your English language proficiency, academic writing, and communication skills.

- [Ask a Study Coach](#)
- [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 the [Service Connect Portal](#), or contact [Service Connect](#).

IT Help

For help with University computer systems and technology, visit <https://students.mq.edu.au/support/technology/service-desk>.

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 2026.03 of the [Handbook](#)