



# BUSA8001

## Applied Predictive Analytics

Session 2, Special circumstances 2021

*Department of Actuarial Studies and Business Analytics*

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#### **Disclaimer**

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#### **Session 2 Learning and Teaching Update**

The decision has been made to conduct study online for the remainder of Session 2 for all units WITHOUT mandatory on-campus learning activities. Exams for Session 2 will also be online where possible to do so.

This is due to the extension of the lockdown orders and to provide certainty around arrangements for the remainder of Session 2. We hope to return to campus beyond Session 2 as soon as it is safe and appropriate to do so.

Some classes/teaching activities cannot be moved online and must be taught on campus. You should already know if you are in one of these classes/teaching activities and your unit convenor will provide you with more information via iLearn. If you want to confirm, see the list of [units with mandatory on-campus classes/teaching activities](#).

Visit the [MQ COVID-19 information page](#) for more detail.

## General Information

|   |
|---|
| Unit convenor and teaching staff<br>Unit Convenor<br>George Milunovich<br><a href="mailto:george.milunovich@mq.edu.au">george.milunovich@mq.edu.au</a>  |
| Credit points<br>10   |
| Prerequisites<br>BUSA8000   |
| Corequisites  |
| Co-badged status  |
| Unit description<br>This unit introduces modern machine learning methodology which is used in solving many business problems in the modern world. Topics will be chosen from a wide set of possible areas including data analytics principles such as training and test data and the bias-variance tradeoff, modern approaches to regression including shrinkage techniques, tree based models and neural networks, methods for classification and the predictive analytics workflow. Emphasis throughout the unit will be on business applications drawn from a variety of fields. |

## 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:** Assess data requirements needed to generate good predictions.
- ULO2:** Apply a number of predictive analytics techniques to a range of business problems.
- ULO3:** Devise computer code required to implement predictive analytics.
- ULO4:** Analyse business problems using data science methods.

## 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

| Name                              | Weighting | Hurdle | Due               |
|-----------------------------------|-----------|--------|-------------------|
| <a href="#">Programming tasks</a> | 30%       | No     | Weeks 3, 5, and 9 |
| <a href="#">Online Test</a>       | 30%       | No     | Week 6            |
| <a href="#">Group Assignment</a>  | 40%       | No     | Week 13           |

### Programming tasks

Assessment Type <sup>1</sup>: Practice-based task

Indicative Time on Task <sup>2</sup>: 20 hours

Due: **Weeks 3, 5, and 9**

Weighting: **30%**

A sequence of tutorial assessments implementing computer code and performing related analytics tasks.

On successful completion you will be able to:

- Assess data requirements needed to generate good predictions.
- Apply a number of predictive analytics techniques to a range of business problems.
- Devise computer code required to implement predictive analytics.

## Online Test

Assessment Type <sup>1</sup>: Quiz/Test

Indicative Time on Task <sup>2</sup>: 20 hours

Due: **Week 6**

Weighting: **30%**

An open book online test will be held.

On successful completion you will be able to:

- Assess data requirements needed to generate good predictions.
- Apply a number of predictive analytics techniques to a range of business problems.
- Devise computer code required to implement predictive analytics.

## Group Assignment

Assessment Type <sup>1</sup>: Modelling task

Indicative Time on Task <sup>2</sup>: 30 hours

Due: **Week 13**

Weighting: **40%**

The group assignment is a hands-on project. Students will be required to develop a predictive model for a real-world dataset and implement it in computer script. Preliminary data analysis will be completed within a group (worth 20%). The follow-up analysis and write up will be completed individually (worth 20%).

On successful completion you will be able to:

- Assess data requirements needed to generate good predictions.
- Apply a number of predictive analytics techniques to a range of business problems.
- Devise computer code required to implement predictive analytics.
- Analyse business problems using data science methods.

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<sup>1</sup> 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.

<sup>2</sup> 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

### Teaching

3 hours of teaching per week

#### Prescribed Textbook

The textbook for this unit is *Python Machine Learning (Third Edition)* by Sebastian Raschka and Vahid Mirjalili. Kindle and paperback versions are available from <https://www.amazon.com.au/Python-Machine-Learning-Sebastian-Raschka/dp/1789955750/>. This book covers most but not all of the topics in the unit. The lecture and tutorial/computer lab notes will cover the additional material that you need to know. Further readings may be assigned for the various topics each week. This will either be journal articles, or other materials available on iLearn, web or available electronically via the Macquarie University Library.

#### Technology Used and Required

- You will need a reasonably good laptop
- Python 3.x and JupyterLab (both available in the free Anaconda Python distribution) and MS Excel will be used extensively throughout the unit, and will be assessed in the class test, assignments and final exam.
- You will need access to the internet to obtain course information, view recorded lectures and download teaching materials from the unit website.
- It is your responsibility to check the unit website regularly to make sure that you are up-to-date with the information for the unit.

#### Required Unit Materials and/or Recommended Readings

- Recorded video lecture and computer labs will be posted on iLearn before the lectures.
- Lecture Notes are the required materials and will be posted on the website before the lectures.
- Relevant references will be provided in Lecture Notes as recommended materials. Some of them will be posted on the website.

## Unit Schedule

| Week | Topic   | Textbook Chapter | Assessment         |
|------|---|------------------|--------------------|
| 1    | Introduction  | Ch. 1            |                    |
| 2    | Classification Algorithms - Part 1                        | Ch. 2            |                    |
| 3    | Classification Algorithms - Part 2                        | Ch. 3            | Programming Task 1 |
| 4    | Classification Algorithms - Part 3                        | Ch. 3            |                    |
| 5    | Data Preprocessing  | Ch. 4            | Programming Task 2 |
| 6    | --- Class Test ---  |                  | Class Test         |
| 7    | Dimensionality Reduction                                  | Ch. 5            |                    |
|      | Recess (2 weeks)  |                  |                    |
| 8    | Model Evaluation and Hyperparameter Tuning                | Ch. 6            |                    |
| 9    | Combining Different Models for Ensemble Learning          | Ch. 7            | Programming Task 3 |
| 10   | Regression Analysis                                       | Ch. 10           |                    |
| 11   | Clustering Analysis                                       | Ch. 11           |                    |
| 12   | Applying Machine Learning to Sentiment Analysis           | Ch. 8            |                    |
| 13   | Embedding a Machine Learning Model into a Web Application | Ch. 9            | Group Assignment   |

## 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:

- [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](#)

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 [ask.mq.edu.au](http://ask.mq.edu.au) or if you are a Global MBA student contact [globalmba.support@mq.edu.au](mailto: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](http://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 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](http://ask.mq.edu.au)

If you are a Global MBA student contact [globalmba.support@mq.edu.au](mailto: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/](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.