BUSA8001

Applied Predictive Analytics

Session 1, Special circumstances 2021

Department of Actuarial Studies and Business Analytics

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Disclaimer

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Notice

As part of Phase 3 of our return to campus plan, most units will now run tutorials, seminars and other small group activities on campus, and most will keep an online version available to those students unable to return or those who choose to continue their studies online.

To check the availability of face-to-face activities for your unit, please go to timetable viewer. To check detailed information on unit assessments visit your unit's iLearn space or consult your unit convenor.

General Information

Unit convenor and teaching staff Unit Convenor George Milunovich george.milunovich@mq.edu.au
Credit points 10
Prerequisites BUSA8000
Corequisites
Co-badged status
Unit description 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 and extensions

Tasks 10% or less – No extensions will be granted. Students who have not submitted the task prior to the deadline will be awarded a mark of 0 for the task, except for cases in which an application for special consideration is made and approved.

Tasks above 10% - No extensions will be granted. There will be a deduction of 10% of the total available marks made from the total awarded mark for each 24 hour period or part thereof that the submission is late (for example, 25 hours late in submission – 20% penalty). This penalty does not apply for cases in which an application for special consideration is made and approved. No submission will be accepted after solutions have been posted.

Assessment Tasks

Name	Weighting	Hurdle	Due
Programming tasks	30%	No	Weeks 3, 5 and 9 (each worth 10%)
Online Test	30%	No	Week 6
Group Assignment	40%	No	Week 13

Programming tasks

Assessment Type [1]: Practice-based task
Indicative Time on Task [2]: 20 hours
Due: **Weeks 3, 5 and 9 (each worth 10%)**
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 [1]: Quiz/Test

Indicative Time on Task [2]: 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 [1]: Modelling task
Indicative Time on Task [2]: 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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[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

Teaching

3 hours of teaching per week consisting of

- One 2 hr lecture (online)
- One 1 hr tutorial/computer lab (online and face-to-face on campus)

Textbooks

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
Recess (2 weeks)			
7	Dimensionality Reduction	Ch. 5	
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). 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). 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

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 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

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.