



# BUSA3020

## Advanced Analytics Techniques

Session 1, Weekday attendance, North Ryde 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

Hume Winzar

[hume.winzar@mq.edu.au](mailto:hume.winzar@mq.edu.au)

Room 732, 4ER

15:00 to 17:00, Tuesdays

Tutor

Arv Hughes

[arvind.hughes@mq.edu.au](mailto:arvind.hughes@mq.edu.au)

Online

TBA

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://students.mq.edu.au/important-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.

## 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
<a href="#"><u>Social Network Analysis</u></a>	20%	No	Friday Week #3 (12 March)
<a href="#"><u>Predictive Analytics</u></a>	20%	No	Friday Week #6 (2 April)
<a href="#"><u>Clustering &amp; Segmentation</u></a>	20%	No	Friday Week #9 (7 May)
<a href="#"><u>Group Project</u></a>	40%	No	Friday Week #13 (4 June)

### Social Network Analysis

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

Indicative Time on Task <sup>2</sup>: 15 hours

Due: **Friday Week #3 (12 March)**

Weighting: **20%**

Data visualisation and key node identification, with explanatory notes.

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.

## Predictive Analytics

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

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

Due: **Friday Week #6 (2 April)**

Weighting: **20%**

Data extraction, visualisation and assessment of alternative software: Use prediction tools from two or more alternative software programs to recommend which program is most useful to a client.

On successful completion you will be able to:

- Apply critical thinking to strategy in analysing firm behaviour.
- Analyse contemporary challenges commonly facing business organisations and how to respond to them.

## Clustering & Segmentation

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

Indicative Time on Task <sup>2</sup>: 15 hours

Due: **Friday Week #9 (7 May)**

Weighting: **20%**

Use appropriate data reduction tools to create a data set with a manageable number of variables, then use appropriate clustering tools to find meaningful groups.

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 <sup>1</sup>: Report

Indicative Time on Task <sup>2</sup>: 35 hours

Due: **Friday Week #13 (4 June)**

Weighting: **40%**

Data wrangling and Predictive analysis: Group will work together on an allocated project/case and submit a 1,000 - 1,500 word 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.

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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 [Learning Skills Unit](#) 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

### 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.
- The timetable for classes can be found on the University web site at: <http://www.timetables.mq.edu.au/>

### Textbook

- '*Business Analytics A Management Approach*', 2019, Richard Vidgen, Sam Kirshner & Felix Tan, [Macmillan International](#) Paperback - 9781352007251 Ebook - 9781352007268 <https://www.macmillanihe.com/page/detail/business-analytics-richard-vidgen/>

### Technology Used and Required

Students will learn to use spreadsheet (*MS-Excel*), Tableau and Gephi. Students will choose to become intermediate-skilled at one of the existing Data Mining/ Analytics packages, such as SPSS Modeler, RapidMiner, Orange, Knime, R statistical package, and others. They will also be exposed to data editing software such as OpenRefine, EasyMorph and Tableau Data Editor.

### Unit Web Page

The web page for this unit can be found at: [iLearn http://ilearn.mq.edu.au](http://ilearn.mq.edu.au)

## Teaching and Learning Strategy

This unit is lecture- and tutorial-based. Typically, the class-time structure will be like this:

- **Lectures:** We will establish links between theory and your personal knowledge from your previous units during class discussions, and then integrate these with applied exercises.
- **Tutorials:** students are required to work on some tasks using appropriate models and techniques. Student participation and meaningful contribution are essential to understand analytics concepts and techniques.

Lecture notes will be posted after each lecture on [\*iLearn\*](#)

## Unit Schedule

### Unit Schedule

Time spent on individual topics and exercises may change as we progress during the session, so some topics may vary from this schedule.

Week #	Topic	Notes
1	Why is analytics so important to business? (Vidgen, Kirshner & Tan, (VKT) Chapter 1)  Define Business needs (VKT Chapter 2)  Social Network Analysis (VKT, Chapter 12)	(23 February)  Assignment: Social Network Analysis briefing
2	Social Network Analysis continued (VKT, Chapter 13)	(2 March)
3	Determine the analytic application/key audience (VKT, Chapter 3)  Data visualisation (VKT, Chapter 4)	(9 March)  Assignment: Predictive Analytics briefing  <b>Assignment: Social Network Analysis due 23:55 Friday 12 March</b>
4	Build the Analysis data set  Predictive models with Regression (VKT, Chapter 6)	(16 March)
5	Predictive models with Logistic Regression (VKT, Chapter 7)  Predictive models with classification & regression trees (VKT, Chapter 8)	(23 March)  Linking business objectives to predictor value.  Introducing software: SPSS Modeler, Rapidminer, WEKA, Orange, and others
6	Neural Networks & Automated learning (VKT, Chapter 10)  Non-linear models, Neural Networks, and exotica	(30 March)  <b>Assignment: Predictive Analytics due 23:55 Friday 2 April</b>

7	Clustering techniques (VKT, Chapter 5)	(20 April) Assignment: Clustering & Segmentation briefing
8	Data Reduction Simplifying data for Clustering	(27 April)
9	More on Clustering techniques	(4 May) <b>Assignment: Clustering &amp; Segmentation due 23:55 Friday 7 May</b>
10	Working in Teams Bringing it together - Business Analytics process (VKT, Chapter 14)	(11 May) Assignment Group Project briefing
11	Combining analytical techniques Idea generation and problem statements (VKT, Chapter 15)	(18 May)
12	Group project consultation session Ethical issues in data gathering and processing (VKT, Chapter 16)	(25 May)
13		(1 June) <b>Assignment Group Project: due 23:55 Friday 4 June</b>

## 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 Enquiry Service

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)

## 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/](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.

## **Changes from Previous Offering**

Updated textbook, and and more specific weekly readings for a tighter unit structure.

Some minor changes to assessment criteria, and more details on assessment expectations.

## **Global Contexts and Sustainability**

This unit teaches Analytics that can be applied in a global context.

## **Research and Practice**

- This unit includes research by the unit lecturer and other Macquarie University researchers
- This unit uses research from external sources.
- This unit gives you opportunities to learn how to critique current research at the frontiers of your discipline as a prelude to later conducting your own research.