BUSA3020

Advanced Analytics Techniques

Session 1, In person/Online-scheduled-weekday, North Ryde 2022

Department of Actuarial Studies and Business Analytics

Contents

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General Information

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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.

General Assessment Information

Late submissions of assessments Unless a Special Consideration request has been submitted and approved, no extensions will be granted. There will be a deduction of 10% of the total available assessment-task marks made from the total awarded mark for each 24-hour period or part thereof that the submission is late. Late submissions will only be accepted up to 96 hours after the due date and time.

No late submissions will be accepted for timed assessments – e.g., quizzes, online tests.

Table 1: Penalty calculation based on submission time

Submission time after the due date (including weekends)	Penalty (% of available assessment task mark)	Example: for a non-timed assessment task marked out of 30
< 24 hours	10%	10% x 30 marks = 3-mark deduction
24-48 hours	20%	20% x 30 marks = 6-mark deduction
48-72 hours	30%	30% x 30 marks = 9-mark deduction
72-96 hours	40%	40% x 30 marks = 12-mark deduction
> 96 hours	100%	Assignment won't be accepted

Special Consideration

To request an extension on the due date/time for a timed or non-timed assessment task, you must submit a Special Consideration application. An application for Special Consideration does not guarantee approval.

The approved extension date for a student becomes the new due date for that student. The late submission penalties above then apply as of the new due date.

Assessment Tasks

Name	Weighting	Hurdle	Due
Predictive Analytics	20%	No	Week 4
Clustering & Segmentation	20%	No	Week 7
Social Network Analysis	20%	No	Week 11
Group Project	40%	No	Week 13

Predictive Analytics

Assessment Type [1]: Practice-based task
Indicative Time on Task [2]: 20 hours
Due: **Week 4**
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 [1]: Practice-based task
Indicative Time on Task [2]: 15 hours
Due: **Week 7**
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.

Social Network Analysis

Assessment Type [1]: Practice-based task
Indicative Time on Task [2]: 15 hours
Due: **Week 11**

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.

Group Project

Assessment Type [1]: Report
Indicative Time on Task [2]: 35 hours
Due: **Week 13**
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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[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.
- The timetable for classes can be found on the University web site at: http://www.timetables.mq.edu.au/

Recommended Textbook

- *Python Machine Learning* (Third Edition) by Raschka and Mirjalili
- *Business Analytics A Management Approach*, 2019, Vidgen, Kirshner & Tan, Macmillan International Paperback - 9781352007251

Technology Used and Required

- **You will need a decent quality laptop**
- Students will use a spreadsheet (MS-Excel), Python, Jupyter Lab and Gephi
- Other technologies that may be used include Data Mining/Analytics packages

Unit Schedule

Week	Topic	Assessment Due
1	Introduction	
2	Classification Techniques 1	
3	Classification Techniques 2	
4	Classification Techniques 3	Assignment: Predictive Analytics
5	Clustering Analysis	
6	Building Good Datasets	
7	Dimensionality Reduction	Assignment: Clustering and Segmentation
	Recess (2 weeks)	
8	Model Evaluation and Ensemble Learning	
9	Social Network Analysis	
10	Regression Analysis	
11	Text and Sentiment Analysis	Assignment: Social Network Analysis
12	Ethical Issues and Group Project Consultation	
13	Group Project Consultation	Assignment: Group Project

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
- 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). 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 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.

Changes since First Published

Date	Description
15/02/2022	Assessment due dates changed, schedule of lectures updated, additional recommended text included