MGMT320

Advanced Analytics Techniques

S1 Day 2018

Archive (Pre-2019) - Dept of Marketing and Management

Contents

General Information

Unit convenor and teaching staff
Unit Convenor, Lecturer
Hume Winzar
hume.winzar@mq.edu.au
E4A 633
Wednesday 2:00pm-3:00pm

Credit points
3

Prerequisites
STAT270 and MGMT220

Corequisites

Co-badged status

Unit description
This is an advanced applied-skills unit which extends concepts and analytical techniques from earlier units. Students will access data from customer databases, security services, transport and social media to create graphical representations of data for analysis of locational maps, social networks, timelines and event flowcharts. Students will clean data in commonly-used spreadsheet formats and make extensive use of proprietary software from big-data orientated companies such as IBM, Google, Tableau and others. 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:

- Develop sound solutions to business problems
- Demonstrate competence in relation to forecasting
- Apply critical thinking to strategy in analysing firm behaviour
- Understand contemporary challenges to business organisations

Assessment Tasks

Name	Weighting	Hurdle	Due
Social Network analysis	20%	No	Week #3
Predictive Analytics	20%	No	Week #6
Clustering & Segmentation	20%	No	Week #9
Group Project	40%	No	Week #13

Social Network analysis

Due: **Week #3**
Weighting: **20%**

Social Network analysis. Interactive visualisation and key node identification, with explanatory notes.

Submission

Submit documents through the link in iLearn.

Late Submission

- No extensions or postponements will be granted. Students who have not completed the task prior to the deadline will be awarded a mark of 0 for the assessment task, except for cases in which an application for Disruption of Studies is made beforehand and approved.

On successful completion you will be able to:

- Develop sound solutions to business problems
- Demonstrate competence in relation to forecasting
- Understand contemporary challenges to business organisations

Predictive Analytics

Due: **Week #6**
Weighting: **20%**

Data extraction, and interactive visualisation

- Apply critical thinking to strategy in analysing firm behaviour
- Link business objecticves to predictor values

Submission

Submit documents through the link in iLearn.

Late Submission

- No extensions or postponements will be granted. Students who have not completed the task prior to the deadline will be awarded a mark of 0 for the assessment task, except for cases in which an application for Disruption of Studies is made beforehand and approved.

On successful completion you will be able to:

- Apply critical thinking to strategy in analysing firm behaviour

Clustering & Segmentation

Due: **Week #9**
Weighting: **20%**

Find market segments of customers for an organisation

Submission

Submit documents through the link in iLearn.

Late Submission

- No extensions or postponements will be granted. Students who have not completed the task prior to the deadline will be awarded a mark of 0 for the assessment task, except for cases in which an application for Disruption of Studies is made beforehand and approved.

On successful completion you will be able to:

- Demonstrate competence in relation to forecasting
- Apply critical thinking to strategy in analysing firm behaviour

Group Project

Due: **Week #13**
Weighting: **40%**

Plan for a major public event, Written report and appropriate software design as appropriate for the task.

Issues of security, media engagement, transportation, and public safety may be involved that require information systems, tracking and reporting. Maximum 2000 words.

Submission

Submit documents through the link in iLearn.

Late Submission

- No extensions or postponements will be granted. Students who have not completed the task prior to the deadline will be awarded a mark of 0 for the assessment task, except for cases in which an application for Disruption of Studies is made beforehand and approved.

On successful completion you will be able to:

- Develop sound solutions to business problems
- Apply critical thinking to strategy in analysing firm behaviour
- Understand contemporary challenges to business organisations

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

- '*Advanced Analytics Methodologies: Driving Business Value with Analytics*', Michele Chambers, Thomas W Dinsmore, **Pearson** ISBN-13: 978-0133498608, ISBN-10: 0133498603

Technology Used and Required

Students will learn to use spreadsheet (*MS-Excel*), Tableau, Gephi, OpenRefine, API's, SPSS Modeler, the R statistical package, and others.

Unit Web Page

The web page for this unit can be found at: ***iLearn*** 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***

Attendance

Studying in Australia whilst on a student visa means you are legally obliged to attend 80% of classes throughout the study period as per their student visa condition 8202 (see https://www.immi.gov.au/students/visa-conditions-students.htm).

Exemptions will be made in the case of serious illness or an unavoidable event where the minimum attendance cannot be made.

If your attendance is less than 90% during a study period of five weeks or fewer, or less than 85 per cent for a study period of more than five weeks, you will be required to attend an interview with Student Services regarding your absences.

If attendance drops to 80% and no substantial evidence has been provided, you will receive an Intention to Report notice. If your attendance then continues to drop below 70 per cent, you will be reported, regardless of any evidence provided.

Unit Schedule

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

Week #	Topic	Notes
1	**Introductions** Housekeeping Why is analytics so important to business? (chapter 4) Define Business needs (chapter 5/8) Social Network Analysis	Assignment #1 briefing: Social Network Analysis
2	SNA continued	
3	Determine the analytic application/key audience (chapter 6)	Assignment #1 due
4	Assignment 1 presentations Build the Analysis data set (chapter 8) Build & Deploy the predictive model (chapter 8)	Assignment #2 briefing: Linking business objectives to predictor value. Introducing software: SPSS
5	Overview Predictive Analytics Techniques (chapter 9) Linear Models	

6	Neural Networks & Automated learning (chapter 9 and Appendix A) 'Watson' & 'Amelia' Additive models (chapter 9)	Assignment #2 due
7	Assignment 2 presentations Clustering techniques	Assignment #3 briefing: Clustering
8	Data Reduction	
9	Geospatial Analysis continued	Assignment #3 due
10	Assignment 3 presentations	Assignment #4: Group Project briefing
11	Combining analytical techniques	
12	Group project consultation session	Assignment #4: Draft report due
13	Assignment 4 presentations	Assignment #4: Final report due

Learning and Teaching Activities

Lectures

Lectures are generally in the form of demonstration and discussion. They precede hands-on tutorials and are an integral part of your assessment.

Tutorial Exercises

In-tutorial activities are designed to help students experience different software programs and procedures, and gain immediate feedback ahead of assignments.

Different Software packages

We will play with several different software for different purposes, and sometimes experiment with the same task in different packages. This may include: Excel, R, SPSS Modeller, Orange, and others.

Group Project

Our employer advisors insist that our graduates are skilled and experienced with working in teams.

Policies and Procedures

Macquarie University policies and procedures are accessible from Policy Central (https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central). 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 *(**Note:** The Special Consideration Policy is effective from 4 December 2017 and replaces the Disruption to Studies Policy.)*

Undergraduate students seeking more policy resources can visit the Student Policy Gateway (https://students.mq.edu.au/support/study/student-policy-gateway). It is your one-stop-shop for the key policies you need to know about throughout your undergraduate student journey.

If you would like to see all the policies relevant to Learning and Teaching visit Policy Central (https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central).

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: https://students.mq.edu.au/study/getting-started/student-conduct

Results

Results shown in *iLearn*, 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.

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 improve your marks and take control of your study.

- Workshops
- StudyWise
- Academic Integrity Module for Students
- Ask a Learning Adviser

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

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.

Graduate Capabilities

Discipline Specific Knowledge and Skills

Our graduates will take with them the intellectual development, depth and breadth of knowledge, scholarly understanding, and specific subject content in their chosen fields to make them competent and confident in their subject or profession. They will be able to demonstrate, where relevant, professional technical competence and meet professional standards. They will be able to articulate the structure of knowledge of their discipline, be able to adapt discipline-specific knowledge to novel situations, and be able to contribute from their discipline to inter-disciplinary solutions to problems.

This graduate capability is supported by:

Learning outcomes

- Develop sound solutions to business problems
- Demonstrate competence in relation to forecasting
- Understand contemporary challenges to business organisations

Assessment tasks

- Social Network analysis
- Predictive Analytics
- Clustering & Segmentation

Critical, Analytical and Integrative Thinking

We want our graduates to be capable of reasoning, questioning and analysing, and to integrate and synthesise learning and knowledge from a range of sources and environments; to be able to critique constraints, assumptions and limitations; to be able to think independently and systemically in relation to scholarly activity, in the workplace, and in the world. We want them to have a level of scientific and information technology literacy.

This graduate capability is supported by:

Learning outcomes

- Develop sound solutions to business problems
- Apply critical thinking to strategy in analysing firm behaviour
- Understand contemporary challenges to business organisations

Assessment tasks

- Social Network analysis
- Predictive Analytics
- Clustering & Segmentation
- Group Project

Problem Solving and Research Capability

Our graduates should be capable of researching; of analysing, and interpreting and assessing data and information in various forms; of drawing connections across fields of knowledge; and they should be able to relate their knowledge to complex situations at work or in the world, in order to diagnose and solve problems. We want them to have the confidence to take the initiative in doing so, within an awareness of their own limitations.

This graduate capability is supported by:

Learning outcomes

- Develop sound solutions to business problems
- Demonstrate competence in relation to forecasting
- Apply critical thinking to strategy in analysing firm behaviour

Assessment tasks

- Social Network analysis
- Clustering & Segmentation
- Group Project

Effective Communication

We want to develop in our students the ability to communicate and convey their views in forms effective with different audiences. We want our graduates to take with them the capability to read, listen, question, gather and evaluate information resources in a variety of formats, assess, write clearly, speak effectively, and to use visual communication and communication technologies as appropriate.

This graduate capability is supported by:

Learning outcomes

- Demonstrate competence in relation to forecasting

- Apply critical thinking to strategy in analysing firm behaviour

Assessment tasks

- Predictive Analytics
- Group Project

Changes from Previous Offering

- Ordering of assessment has changed: Social Network Analysis comes ahead of other work.
- Instruction on Geospacial Analysis has been dropped in favour of more extensive work on predictive analysis, clustering and data reduction.
- Some other minor improvements

Global Contexts and Sustainability

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

Sustainability issues are embedded in our discussions of equity, privacy and ethics throughout the progress of this unit.

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.

- International Journal of Business Analytics (IJBAN)
- International Journal of Business Analytics and Intelligence
- Database Systems Journal
- Business & Information Systems Engineering