



MONASH University

## Business and Economics

### Unit Guide

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ETX2250

Data visualisation and analytics

Summer semester B, 2020

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<https://tutorcs.com>

*We acknowledge and pay respects to the Traditional Owners and Elders - past, present and emerging - of the lands and waters on which Monash University operates.*

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Handbook link:

<http://monash.edu.au/pubs/2020handbooks/units/ETX2250.html>

The information contained in this unit guide is correct at time of publication. The University has the right to change any of the elements contained in this document at any time.

*Last updated: 19 Dec 2019*

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# Unit handbook information

## Synopsis

Business analytics can unlock the hidden insights in data to give businesses a competitive advantage. Many businesses have masses of data about customers and operations, and need skilled analysts to uncover insights and make informed predictions.

This unit uses data visualisation to explore and analyse data sets of all sizes, and it introduces some business analytic models for interpretation and prediction.

It will introduce an appropriate software environment for data visualisation, and analytics, and cover visualisation and analysis techniques for categorical and numerical variables. Visualisation methods to be covered include some of Box-and-whisker plots, Mosaics, Rotatable 3D scatter plots, Heat maps, Motion charts, cluster and association charts. Models to be covered may include linear regression models, classification and regression trees, and random forests. Methods for evaluating model performance will also be discussed. Examples from marketing, finance, economics and related disciplines will be included.

## Mode of Delivery

Caulfield (On-campus block of classes)

<https://tutorcs.com>

## Workload requirements

Minimum total expected workload to achieve the learning outcomes for this unit is 144 hours per semester typically comprising a mixture of scheduled learning activities and independent study. Independent study may include associated readings, assessment and preparation for scheduled activities. The unit requires on average four hours of scheduled activities per week when taught in trimester mode, and three to four hours three times per week when taken as a summer unit. Scheduled activities may include a combination of teacher directed learning, peer directed learning and online engagement.

## Unit relationships

### Prerequisites

ETC1000 or SCI1020 or ETS1102 or FIT1006 or ETW1100 or ETF1100 or STA1010 or ETW1000

### Prohibitions

FIT3152

### Co-requisites

None

## Enrolment rules

None

## Chief Examiner

Name: Dr Klaus Ackermann

Campus: Clayton

Phone: +61 3 990 54695

Email: [Klaus.Ackermann@monash.edu](mailto:Klaus.Ackermann@monash.edu)

## Unit Coordinator(s)

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## Academic overview

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## Unit learning outcomes

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On successful completion of this unit you should be able to:

1. select, create and interpret appropriate types of visual representation for a given set of data
2. select and develop model types with explanatory and/or predictive ability
3. make appropriate use of in-sample and out-of-sample evaluation of models
4. apply the above research skills to produce innovative solutions in finance, marketing, economics and related areas
5. use visualisation and modelling to effectively communicate the results of their investigations
6. explain the sequence of procedures that should be applied to analyse a given dataset.

## Teaching approach

Active learning in workshops with team teaching

## **Recording of lectures**

As this unit does not have lectures or seminars, there are no recordings made of face-to-face classes.

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# Unit schedule

For units with on-campus classes, teaching activities are normally scheduled to start on the hour (teaching will commence on the hour and conclude 10 minutes prior to the scheduled end time).

Students should note that the program outlined below is a guide to the material to be covered in this unit and not a definitive statement of when that material will be covered. Specific details relating to the timing will be discussed in class.

Day	Topics and Activities	Assessment
1	Introduction to the unit and to R	Participation
2	Concepts in data visualisation and implementation in R	Participation
3	Concepts in data visualisation and implementation in R	Participation
4	Concepts in data visualisation and implementation in R	Participation / Assignment 1 due
5	Concepts in data visualisation and implementation in R	Participation
6	Concepts in data visualisation and implementation in R	Participation
7	Hierarchical Clustering	Participation
8	K-Means Clustering	Participation / Assignment 2 due
9	Association Analysis	Participation
10	Classification trees	Participation
11	Regression trees	Participation
12	Review	Participation / Assignment 3 due

## Calendar for class days

Day 01: Monday, 6.1.2020  
Day 02: Wednesday, 8.1.2020  
Day 03: Friday, 10.1.2020  
Day 04: Monday, 13.1.2020  
Day 05: Wednesday, 15.1.2020  
Day 06: Friday, 17.1.2020  
Day 07: Monday, 20.1.2020

Day 08: Wednesday, 22.1.2020  
Day 09: Friday, 24.1.2020  
Day 10: Tuesday, 28.1.2020 (after Australia day)  
Day 11: Wednesday, 29.1.2020  
Day 12: Friday, 31.1.2020

Class 9am - 12pm, Day 1-Day 12

## Assessment summary

Within semester assessment: 50% + Examination: 50%

Assessment task	Value	Due date
Assignment 1	10%	Day 4 (13 January)
Assignment 2	15%	Day 8 (22 January 2020)
Assignment 3	15%	Day 12 (31 January)
Participation - Flux Pools	10%	Day 2-11
ETX2250/ETF5922 Data Visualisation and Analytics	50%	To be advised

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A student's final mark is normally the sum of the marks obtained in all of the individual assessment items in the unit.

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## Second marking

In the Faculty of Business and Economics, all of the following assessment items graded as a fail by the first marker are blind marked by a second marker:

- examination papers
- in-semester assessment items worth 20% or more

## Return of final marks

Faculty policy states that 'the final mark that a student receives for a unit will be determined by the Board of Examiners taking into account all aspects of assessment'.

The final mark for this unit will be released by the Board of Examiners on the date nominated in the Faculty Calendar. Student results will be accessible through the my.monash portal.

## Exam viewing

Feedback on student performance in examinations and other end-of-semester assessment is required. The feedback should be in accordance with the University's procedures on Unit Assessment. Details of the examination script viewing arrangements set down by the Faculty of



Business and Economics are available at <https://www.monash.edu/business/current-students/forms-and-guidelines/policies-and-procedures/examination-feedback-procedure>

## Assessment criteria

Assessment Criteria Grading Descriptors available at:  
[https://www.monash.edu/\\_data/assets/pdf\\_file/0006/801690/Assessment-in-Coursework-Units-Grading-and-Marking-Procedures.pdf](https://www.monash.edu/_data/assets/pdf_file/0006/801690/Assessment-in-Coursework-Units-Grading-and-Marking-Procedures.pdf)

## Assessment requirements

### Hurdle requirement

There is a hurdle requirement in this unit. The hurdle requirement is that students must attain a mark of at least **50%** in the Final Exam / Final Major Assessment Task. A student's final mark is normally the sum of the marks obtained in all of the assessment tasks in the unit. Where a student does not meet the hurdle requirement, the maximum mark that may be returned for the unit is 48.

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### Assessment tasks

<https://tutorcs.com>

**Assessment task title:** Assignment 1

**Due Date:** Day 4 (13 January)

**Weighting/Value:** 10% **WeChat: cstutorcs**

**Details of Task:** Visualising and modifying data sets using R

**Release date:** Day 1 (6 January 2020)

**Word limit:** TBA

**Presentation requirements:** Jupyter R notebook file

**Estimated return date:** 22 January

**Criteria for marking:** Marking criteria will be provided on the question paper

**Learning objectives assessed:** 1

**Submission details:** Submit the digital file through Moodle.

**Penalties for late lodgement:** 30% for each day late

**Assessment coversheet:** Appropriate cover sheets will be provided on Moodle.

**Additional information:** Additional information will be supplied with question paper.

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**Assessment task title:** Assignment 2

**Due Date:** Day 8 (22 January 2020)

**Weighting/Value:** 15%

**Details of Task:** Visualising and describing data sets using R

**Release date:** Day 4 (13 January 2020)

**Word limit:** TBA

**Presentation requirements:** Document as PDF - details to be provided on question paper.

**Estimated return date:** 31 January

**Criteria for marking:** Marking criteria will be provided on the question paper

**Learning objectives assessed:** 1,6

**Submission details:** Submitted in as a soft copy through Moodle.

**Penalties for late lodgement:** 30% for each day late

**Assessment coversheet:** Appropriate cover sheets will be provided on Moodle.

**Additional information:** Additional information will be supplied with question paper.

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**Assessment task title:** Assignment 3

**Due Date:** Day 12 (31 January)

**Weighting/Value:** 15%

**Details of Task:** Applying analytics methods to a dataset.

**Release date:** Day 8 (21 January)

**Word limit:** NA

**Presentation requirements:** Document as PDF - details to be provided on question paper.

**Estimated return date:** TBA

**Criteria for marking:** Supplied on question paper

**Learning objectives assessed:** 2,3,4,5,6

**Submission details:** Submitted in as a soft copy through Moodle.

**Penalties for late lodgement:** Except where you are eligible for within-semester special consideration, no late assignments will be accepted. In the case of severe illness or other exceptional circumstances, you may submit a special consideration form which can be found at <http://www.monash.edu/connect/forms>

**Assessment coversheet:** Provided on Moodle

**Additional information:** Will be supplied on question paper

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<https://tutorcs.com>

**Assessment task title:** Participation - Flux Polls

**Due Date:** Day 2-11

**Weighting/Value:** 10%

**Details of Task:**

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Students will be required to complete in-workshop polls.

**Release date:** Day 2-11

**Word limit:** NA

**Presentation requirements:** n/a

**Estimated return date:** 2 days after submission

**Criteria for marking:** Supplied with each task.

**Learning objectives assessed:**

All Learning Objectives

**Submission details:**

During the workshop

**Penalties for late lodgement:**

No late lodgement is possible.

**Assessment coversheet:** n/a

**Additional information:**

A wifi enabled laptop or smart device is required to complete this task in workshops.

The overall mark for this assessment category will be determined using a 'best of' approach.

Of the n assessments in the category, the final mark will use the best (i.e., highest) (n-1) assessments to calculate your final mark in this assessment category.

This implies that for each assessment in this category one submission may be omitted for students who are absent without documented reasons/medical certificates.

You will get zero marks if you do not enter your name and Monash student authcate correctly (as required).

## **ETX2250/ETF5922 Data Visualisation and Analytics**

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*This unit may employ electronic assessment for the final exam. Further details will be provided to you by Week 4 of Semester.*

**Weighting:** 50%

**Length:** 2 hours with 10 minutes reading time

**Type (open/closed book):** closed book

**Exam details:**

<https://tutorcs.com>

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The learning outcomes in this unit require students to demonstrate in the final summative assessment task a comprehensive understanding of topics covered in the unit. This is demonstrated by the requirement that the student must attain a mark of at least 50% in the final examination. There will be a two-hour closed book exam during the official summer examination period. Students will find it useful to have a calculator (which must be HP10bII+), and also a ruler.

### **Electronic devices allowed in the exam:**

Calculators are permitted in the exam. The only Faculty approved calculators permitted in tests and examinations for all Australian campuses and locations is the HP10bII+ or Casio FX82 (any suffix). Students are required to purchase their own calculator and are responsible for ensuring the calculator is in good working order and to have a set of spare batteries.

## **Referencing requirements**

To build your skills in citing and referencing, and using different referencing styles, see the online tutorial Academic Integrity: Demystifying Citing and Referencing at <http://www.lib.monash.edu/tutorials/citing/>

## Feedback

### Our feedback to you

Types of feedback you can expect to receive in this unit are:

- Formal individual feedback on assignments expressed as a letter grade
- Answers to questions relating to the discipline or the unit's work
- Advice about seeking additional help to develop your writing or research skills
- Informal feedback relating to class activities

### Your feedback to us

One of the formal ways students have to provide feedback on teaching and their learning experience is through the Student Evaluation of Teaching and Units (SETU) survey. The feedback is anonymous and provides the Faculty with evidence of aspects that students are satisfied with and areas for improvement.

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<https://tutorcs.com>

### Previous student evaluations of this unit

In response to previous SETU results of this unit, the following changes have been made:

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In response to previous comments, readings will be recommended for each workshop.

If you wish to view how previous students rated this unit, please go to:

<https://www.monash.edu/ups/setu/about/setu-results/unit-evaluation-reports>

## Bring your own device

**Please note:** This is a bring your own device unit. You will be expected to bring a web-connected device to class to access specialist software. The applications for your class can be accessed at the website [move.monash.edu](http://move.monash.edu)

For more information, visit [monash.edu/move](http://monash.edu/move)

## Learning resources

Monash Library Unit Reading List (if applicable to the unit): <http://monash.rl.talis.com/index.html>  
Research and Learning Online: [www.monash.edu/rlo](http://www.monash.edu/rlo)

## Required resources

Students generally must be able to complete the requirements of their course without the imposition of fees that are additional to the student contribution amount or tuition fees. However, students may be charged certain incidental fees or be expected to make certain purchases to support their study. For more information about this, refer to the Higher Education Administrative Information for Providers, Chapter 18, Incidental Fees at <http://education.gov.au/help-resources-providers>

Students will want to use their own laptop in the class and assignments. However, some lab space will be available for private study and tutor consultation on the afternoons of class days.

## Technological requirements

Virtual learning environment (VLE): Moodle

Material used in class together with other information of importance to you will be published online via the unit's Moodle site. In order to access information about this unit in Moodle you must be enrolled in the unit and have a valid student account with authentic username and password. Moodle can be accessed through my.monash portal by clicking on the Moodle link under "Online systems". If you need some help with Moodle then check out the Moodle Support for Students page.

## Q Manual Assignment Project Exam Help

Work submitted for assessment must be consistent with the guidelines set down in the Q Manual, which is the faculty's student guide for producing quality work on time. Copies of this manual can be purchased at the bookshop or accessed online at <https://www.monash.edu/business/current-students/study-resources/qmanual.pdf>

## Prescribed text and readings

Shmueli, Galit, Peter C. Bruce, Inbal Yahav, Nitin R. Patel, and Kenneth C. Lichtendahl Jr. *Data mining for business analytics: concepts, techniques, and applications in R*. John Wiley & Sons, 2017.

## Other information

### Policies

Monash has educational policies, procedures and guidelines, which are designed to ensure that staff and students are aware of the University's academic standards, and to provide advice on how they might uphold them. You can find Monash's Education Policies at: <http://www.policy.monash.edu/policy-bank/academic/education/index.html>

### Student Academic Integrity Policy

## Special Consideration

For information on applying for special consideration, please visit: <http://www.monash.edu/exams/changes/special-consideration>

## Graduate Attributes Policy

<http://www.monash.edu/policy-bank/academic/education/course-governance-and-design/course-design-policy>

## Student Charter

[www.monash.edu/students/policies/student-charter.html](http://www.monash.edu/students/policies/student-charter.html)

## Student Services

The University provides many different kinds of services to help you gain the most from your studies. Further information is available at [www.monash.edu/students](http://www.monash.edu/students)

You can also access important information from the Faculty of Business and Economics current students page <https://www.monash.edu/business/current-students>

English Connect provide services to improve and develop your language skills with workshops and programs, including online English Connect Grammar Resources, Let's Chat conversational and oral skills group sessions, workshops on oral presentation and public speaking skills (Speaking with Confidence) and grammar or academic English (Polish Up Your Grammar). Peer Support (one on one service) runs out of the Library and is to assist you with written assignments. You can register or gain more information at <http://www.monash.edu/english-connect>

## Monash University Library

The Monash University Library provides a range of services, resources and programs that enable you to save time and be more effective in your learning and research.

Go to <http://www.monash.edu/library> or the library tab in [my.monash](http://my.monash) portal for more information.

## Disability Support Services

Students who have a disability, ongoing medical or mental health condition should contact Disability Support Services.

Disability Support Services also support students who are carers of a person who is aged and frail or has a disability, medical condition or mental health condition.

Disability Support Services will assess each student and recommend reasonable adjustment to teaching and assessment practices.

For within semester assessment activities, it is the students responsibility to provide confirmation of their requirement for alternative arrangements to the Chief Examiner or appropriate faculty

contact person responsible for administering the arrangements no later than two week before the assessment.

For mid semester tests being conducted at the Caulfield Racecourse, DSS provide the adjustments (eg larger font) and instructions to Exams Branch.

[https://www.monash.edu/\\_data/assets/pdf\\_file/0004/801616/Assessment-in-Coursework-Units-Adjustments-to-Assessment-Procedures.pdf](https://www.monash.edu/_data/assets/pdf_file/0004/801616/Assessment-in-Coursework-Units-Adjustments-to-Assessment-Procedures.pdf)

Students Disability Advisers visit all Victorian campuses on a regular basis.

- Australian Campus Website: [monash.edu/disability](https://www.monash.edu/disability)
- Monash Malaysia Website: <https://www.monash.edu.my/student-services/support-services/disability-support>
- Monash South Africa Website: <https://www.iiemsa.co.za/disability-support/>
- Email: [disabilitysupportservices@monash.edu](mailto:disabilitysupportservices@monash.edu)

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