COMP2200
Data Science
Session 1, Online-scheduled-weekday 2023
School of Computing

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## General Information

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### Credit points
10

### Prerequisites
(COMP1000 or COMP115 or COMP1010 or COMP125) and (STAT1170 or STAT170 or STAT1371 or STAT171 or STAT1250 or STAT150)

### Corequisites

Co-badged status
COMP6200
**Unit guide** COMP2200 Data Science

**Unit description**
This unit introduces students to the fundamental techniques and tools of data science, such as the graphical display of data, predictive models, evaluation methodologies, regression, classification and clustering. The unit provides practical experience applying these methods using industry-standard software tools to real-world data sets. Students who have completed this unit will be able to identify which data science methods are most appropriate for a real-world data set, apply these methods to the data set, and interpret the results of the analysis they have performed.

**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](https://www.mq.edu.au/study/calendar-of-dates)

**Learning Outcomes**
On successful completion of this unit, you will be able to:

**ULO1**: Identify the appropriate Data Science analysis for a problem and apply that method to the problem.

**ULO2**: Interpret Data Science analyses and summarise and identify the most important aspects of a Data Science analysis.

**ULO3**: Present the results of their Data Science analyses both verbally and in written form.

**ULO4**: Discuss the broader implications of Data Science analyses.

**Assessment Tasks**

<table>
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<tr>
<th>Name</th>
<th>Weighting</th>
<th>Hurdle</th>
<th>Due</th>
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<tbody>
<tr>
<td><strong>Critical Analysis Task</strong></td>
<td>15%</td>
<td>No</td>
<td>Week 13</td>
</tr>
<tr>
<td><strong>Weekly tasks</strong></td>
<td>10%</td>
<td>Yes</td>
<td>Every Week</td>
</tr>
<tr>
<td><strong>Examinations</strong></td>
<td>40%</td>
<td>No</td>
<td>Week 7 and Exam weeks</td>
</tr>
<tr>
<td><strong>Data Science Portfolio</strong></td>
<td>35%</td>
<td>No</td>
<td>Weeks 4, 6, 8, 10, 11</td>
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**Critical Analysis Task**
Assessment Type 1: Report
Indicative Time on Task 2: 15 hours
Due: **Week 13**
Weighting: **15%**
You will be given a sample notebook describing the analysis of a dataset. You will provide a critical analysis of this notebook and suggest improvements in the way that data is analysed and results are presented.

On successful completion you will be able to:

• Identify the appropriate Data Science analysis for a problem and apply that method to the problem.
• Interpret Data Science analyses and summarise and identify the most important aspects of a Data Science analysis.
• Present the results of their Data Science analyses both verbally and in written form.
• Discuss the broader implications of Data Science analyses.

Weekly tasks

Assessment Type 1: Practice-based task
Indicative Time on Task 2: 0 hours
Due: Every Week
Weighting: 10%
This is a hurdle assessment task (see assessment policy for more information on hurdle assessment tasks)

Development of knowledge and skills requires continual practice at authentic problems. During weekly workshops you will practice a range of tasks recording your progress on worksheets. To pass this hurdle assessment, you must be able to demonstrate your progress in developing and communicating knowledge and skills in a minimum of 8 of the 12 weekly workshops.

On successful completion you will be able to:

• Interpret Data Science analyses and summarise and identify the most important aspects of a Data Science analysis.
• Present the results of their Data Science analyses both verbally and in written form.

Examinations

Assessment Type 1: Examination
Indicative Time on Task 2: 10 hours
Due: Week 7 and Exam weeks
Weighting: 40%
Examinations will assess your knowledge and understanding of the data analysis and machine learning methods covered in the semester.

On successful completion you will be able to:

- Interpret Data Science analyses and summarise and identify the most important aspects of a Data Science analysis.
- Discuss the broader implications of Data Science analyses.

Data Science Portfolio

Assessment Type 1: Portfolio
Indicative Time on Task 2: 45 hours
Due: Weeks 4, 6, 8, 10, 11
Weighting: 35%

The portfolio assessment will consist of a number of data analysis problems that you will be given through the semester. These will involve writing code to analyse one or more data sets. These will be marked individually through the semester and then as an overall portfolio at the end of semester.

On successful completion you will be able to:

- Identify the appropriate Data Science analysis for a problem and apply that method to the problem.
- Interpret Data Science analyses and summarise and identify the most important aspects of a Data Science analysis.
- Present the results of their Data Science analyses both verbally and in written form.
- Discuss the broader implications of Data Science analyses.

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
There will be one two hour online lecture each week, and one two hour workshop in the computing laboratory or online. The online lecture would be in the form of live streaming or pre-recorded lecture videos. You are expected to attend both classes as they provide complimentary learning activities each week. In practical classes you will write code and experiment with various data sets; in lectures we will discuss the methods you are learning and how the results of your analysis can be interpreted.

Textbooks
We will refer to the following texts during the semester:

Introduction to Data Science A Python Approach to Concepts, Techniques and Applications Igual, Laura, Seguí, Santi (electronic edition available via MQ Library)

Computational and Inferential Thinking: The Foundations of Data Science By Ani Adhikari and John DeNero (available on GitBooks)

You will be given readings from these and other sources each week.

Technology Used and Required
We will make use of Python 3 for data analysis, including a range of modules such as scikit-learn, pandas, numpy that provide additional features. These can all be installed via the Anaconda a Python distribution. We will discuss this environment and the installation process in the first week of classes.

We will use Jupyter Notebook as a way of developing and presenting the analysis results. This is included in the full Anaconda distribution.

Requirements to Pass this Unit
To pass this unit you must:

• Achieve a total mark equal to or greater than 50%, and
• Participate in, and undertake all hurdle activities for, a minimum of 8 of the 12 weekly workshops
Hurdle Assessments

Assessment 1: Practice-based task (10%)

Development of knowledge and skills requires continual practice at authentic problems in a laboratory-based setting. This unit has weekly laboratory classes and you must demonstrate your progress in developing and communicating knowledge and skills in a minimum of 8 of the 12 workshop practicals. This is a hurdle assessment meaning that failure to meet this requirement may result in a fail grade for the unit. It is not allowed to take the second chance of each workshop hurdle assessment.

Late Assessment Submission Penalty

Unless a Special Consideration request has been submitted and approved, a 5% penalty (of the total possible mark of the task) will be applied for each day a written report or presentation assessment is not submitted, up until the 7th day (including weekends). After the 7th day, a grade of ‘0’ will be awarded even if the assessment is submitted. The submission time for all uploaded assessments is 11:55 pm. A 1-hour grace period will be provided to students who experience a technical concern.

For any late submission of time-sensitive tasks, such as scheduled tests/exams, performance assessments/presentations, and/or scheduled practical assessments/labs, please apply for Special Consideration.

Assessments where Late Submissions will be accepted

Assessment Portfolios, Workshops, Reflective Report and Critical Assessment Task—YES, Standard Late Penalty applies

Assessment Mid Exam, Final Exam—NO, unless Special Consideration is Granted

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
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 Advocacy** provides independent advice on MQ policies, procedures, and processes

**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/](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.