# STAT2170

**Applied Statistics**

Session 1, In person-scheduled-weekday, North Ryde 2024

*School of Mathematical and Physical Sciences*

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## Disclaimer

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General Information

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Lecturer
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Credit points
10

Prerequisites
FOSE1015 or STAT170(P) or STAT1170 or STAT171 or STAT1371 or STAT150 or STAT1250

Corequisites

Co-badged status
STAT6180

Unit description
This unit aims to extend and broaden statistical experience from 1000-level statistics units, with a focus on application to real-world analysis. It covers relationships between categorical or continuous explanatory variables and a continuous response variable using the techniques of one-way and two-way analysis of variance and simple and multiple linear regression. Data management, report writing, graphical presentation of results, and power analysis are discussed.

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: Summarise data graphically and numerically and interpret them.
ULO2: Apply appropriate statistical methods, such as one-way ANOVA, two-way ANOVA and multiple regression, to answer research questions.
ULO3: Justify and evaluate the assumptions underlying the models, and modify the analysis if needed.
ULO4: Use statistical software to create model output and interpret them.
ULO5: Demonstrate foundational learning skills including active engagement in their learning process.

## General Assessment Information

### 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 the Practice-based activities for a minimum of 10 of the 12 weekly SGTAs.

### Hurdle Assessments

Most of our hurdle assessments are linked to our teaching activities.

**Assessment 1: Practice-based skills for SGTA classes (0%)**

Development of knowledge and skills requires continual practice. During SGTAs you will practice a range of statistical techniques. To pass this hurdle assessment, you must be able to demonstrate your progress in developing and communicating knowledge and skills in 10 out of 12 SGTAs. This is a hurdle assessment meaning that failure to meet this requirement may result in a **fail** grade for the unit. Students are permitted up to two absences: **additional absences will require a Special Consideration to be applied for** (see below).

### Late Assessment Submission Penalty

Unless a Special Consideration request has been submitted and approved, a 5% penalty (of the total possible mark) will be applied each day a written 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. Submission time for all written assessments is set at 11:55 pm. A 1-hour grace period is 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, students need to submit an application for Special Consideration.

### Assessments where Late Submissions will be accepted.

- Participation to SGTA classes – NO, unless Special Consideration is granted;
- iLearn Quiz – NO, unless Special Consideration is granted;
- Mid-Semester Test – NO, unless Special Consideration is granted;
- Assignment – YES, Standard Late Penalty applies;
• Final Exam – NO, unless Special Consideration is granted.

**Special Consideration**

The Special Consideration Policy aims to support students who have been impacted by short-term circumstances or events that are serious, unavoidable and significantly disruptive, and which may affect their performance in assessment.

**Written Assessments/Quizzes/Tests:** If you experience circumstances or events that affect your ability to complete the written assessments in this unit on time, please inform the convenor and submit a Special Consideration request through ask.mq.edu.au.

**Weekly practice-based tasks for SGTA classes:** To pass the unit you need to demonstrate ongoing development of skills and application of knowledge in 10 out of 12 of the weekly SGTA classes. If you miss a weekly SGTA class due to a serious, unavoidable and significant disruption, contact your convenor ASAP as you may be able to attend another class that week.

If it is not possible to attend another class, you should still contact your convenor for access to class material to review in your own time.

Note that a Special Consideration should only be applied for if you miss more than two of the weekly SGTA classes.

### Assessment Tasks

<table>
<thead>
<tr>
<th>Name</th>
<th>Weighting</th>
<th>Hurdle</th>
<th>Due</th>
</tr>
</thead>
<tbody>
<tr>
<td>Practice Based Skills</td>
<td>0%</td>
<td>Yes</td>
<td>Weekly</td>
</tr>
<tr>
<td>iLearn Quiz</td>
<td>20%</td>
<td>No</td>
<td>Week 4</td>
</tr>
<tr>
<td>Mid-Semester Test</td>
<td>25%</td>
<td>No</td>
<td>Week 7</td>
</tr>
<tr>
<td>Assignment</td>
<td>25%</td>
<td>No</td>
<td>Week 11</td>
</tr>
<tr>
<td>Final Exam</td>
<td>30%</td>
<td>No</td>
<td>Formal Examination Period</td>
</tr>
</tbody>
</table>

**Practice Based Skills**

Assessment Type: Practice-based task
Indicative Time on Task: 6 hours
Due: **Weekly**
Weighting: 0%

This is a hurdle assessment task (see **assessment policy** for more information on hurdle assessment tasks)

Development of knowledge and skills requires continual practice. During SGTAs you will practice a range of statistical & computational techniques. To pass this hurdle assessment, you must be
able to demonstrate your progress in developing and communicating knowledge and skills in 10 out of 12 SGTAs.

On successful completion you will be able to:

- Demonstrate foundational learning skills including active engagement in their learning process.

**iLearn Quiz**

Assessment Type: Quiz/Test  
Indicative Time on Task: 1 hours  
Due: Week 4  
Weighting: 20%

The quiz will become available on iLearn.

On successful completion you will be able to:

- Summarise data graphically and numerically and interpret them.  
- Apply appropriate statistical methods, such as one-way ANOVA, two-way ANOVA and multiple regression, to answer research questions.  
- Justify and evaluate the assumptions underlying the models, and modify the analysis if needed.  
- Use statistical software to create model output and interpret them.

**Mid-Semester Test**

Assessment Type: Quiz/Test  
Indicative Time on Task: 1 hours  
Due: Week 7  
Weighting: 25%

Mid-Semester Test

On successful completion you will be able to:

- Summarise data graphically and numerically and interpret them.  
- Apply appropriate statistical methods, such as one-way ANOVA, two-way ANOVA and
multiple regression, to answer research questions.

- Justify and evaluate the assumptions underlying the models, and modify the analysis if needed.
- Use statistical software to create model output and interpret them.

Assignment
Assessment Type 1: Quantitative analysis task
Indicative Time on Task 2: 10 hours
Due: Week 11
Weighting: 25%

The assignment will cover all learning outcomes.

On successful completion you will be able to:
- Summarise data graphically and numerically and interpret them.
- Apply appropriate statistical methods, such as one-way ANOVA, two-way ANOVA and multiple regression, to answer research questions.
- Justify and evaluate the assumptions underlying the models, and modify the analysis if needed.
- Use statistical software to create model output and interpret them.
- Demonstrate foundational learning skills including active engagement in their learning process.

Final Exam
Assessment Type 1: Examination
Indicative Time on Task 2: 2 hours
Due: Formal Examination Period
Weighting: 30%

Formal invigilated examination testing the learning outcomes of the unit.

On successful completion you will be able to:
- Summarise data graphically and numerically and interpret them.
- Apply appropriate statistical methods, such as one-way ANOVA, two-way ANOVA and multiple regression, to answer research questions.
• Justify and evaluate the assumptions underlying the models, and modify the analysis if needed.
• Use statistical software to create model output and interpret them.

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
Lectures (beginning in Week 1): There is one two-hour lectures each week.

SGTA classes (beginning in Week 2): Students must register in and attend one two-hour class per week.

The timetable for classes can be found on the University website at: https://timetables.mq.edu.au/

Enrolment can be managed using eStudent at: https://students.mq.edu.au/support/technology/systems/estudent

Suggested textbooks
The following textbook is useful as supplementary resources, for additional questions and explanations. They are available from the Macquarie University library:
  • Moore, D.S., 2017. Introduction to the Practice of Statistics. WH Freeman and company.

Technology Used and Required
This subject requires the use of the following computer software:
  • R: R is a free statistical software package. Access and installation instructions may be found at: https://www.r-project.org/
  • RStudio: RStudio is an open-source tool that is used to manage and present work performed using R. Access and installation instructions may be found at https://rstudio.com/products/rstudio/download/

Communication
We will communicate with you via your university email or through announcements on iLearn. Queries to convenors can either be placed on the iLearn discussion forum or sent to your
COVID Information

For the latest information on the University’s response to COVID-19, please refer to the Coronavirus infection page on the Macquarie website: https://www.mq.edu.au/about/coronavirus-faqs. Remember to check this page regularly in case the information and requirements change during semester. If there are any changes to this unit in relation to COVID, these will be communicated via iLearn.

Unit Schedule

This is a draft schedule and is subjected to change.

<table>
<thead>
<tr>
<th>Week</th>
<th>Topics</th>
<th>Assignment</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Course introduction; One-sided tests; Type I and Type II error; Introduction to R/RStudio</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Modified two-sample t-test; Assessing normality and equal variance assumptions</td>
<td>iLearn Quizzes Due</td>
</tr>
<tr>
<td>3</td>
<td>One way ANOVA</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>One way ANOVA, Multiple comparisons</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Transformations; Non-parametrics; Power and Sample Size</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Data management; R Markdown; Simple linear regression</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Simple linear regression and model validation; Multiple regression</td>
<td>Mid-Semester Test Due</td>
</tr>
<tr>
<td>8</td>
<td>Multiple regression and model validation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Session Break</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Extensions and examples of multiple regression</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Two-way ANOVA</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Two-Way ANOVA and Multiple Comparisons</td>
<td>Assignment Due</td>
</tr>
<tr>
<td>12</td>
<td>Two-Way ANOVA, Regression and Multiple Comparisons</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Exam Details and Revision</td>
<td></td>
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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
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/.

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

We value student feedback to be able to continually improve the way we offer our units. As such we encourage students to provide constructive feedback via student surveys, to the teaching staff directly, or via the FSE Student Experience & Feedback link in the iLearn page.

Unit information based on version 2024.01R of the Handbook