STAT2173
Introduction to Probability
Session 1, Special circumstances 2021
Department of Mathematics and Statistics

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Notice
As part of Phase 3 of our return to campus plan, most units will now run tutorials, seminars and other small group activities on campus, and most will keep an online version available to those students unable to return or those who choose to continue their studies online.

To check the availability of face-to-face activities for your unit, please go to timetable viewer. To check detailed information on unit assessments visit your unit's iLearn space or consult your unit convenor.
## General Information

<table>
<thead>
<tr>
<th>Unit convenor and teaching staff</th>
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<tbody>
<tr>
<td>Lead Unit Convenor/Lecturer</td>
</tr>
<tr>
<td>Georgy Sofronov</td>
</tr>
<tr>
<td><a href="mailto:georgy.sofronov@mq.edu.au">georgy.sofronov@mq.edu.au</a></td>
</tr>
<tr>
<td>Contact via iLearn</td>
</tr>
<tr>
<td>Hassan Doosti</td>
</tr>
<tr>
<td><a href="mailto:hassan.doosti@mq.edu.au">hassan.doosti@mq.edu.au</a></td>
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<table>
<thead>
<tr>
<th>Credit points</th>
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<tbody>
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<table>
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<tr>
<th>Prerequisites</th>
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<tbody>
<tr>
<td>(FOSE1015 or STAT170(P) or STAT1170(P) or STAT171 or STAT1371 or STAT150 or STAT1250) and ((HSC Mathematics Band 2 or Extension 1 or Extension 2) or (10cp from FOSE1005 or MATH1000 or MATH1010-MATH1025 or MATH111-MATH339))</td>
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<table>
<thead>
<tr>
<th>Corequisites</th>
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<table>
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<tr>
<th>Co-badged status</th>
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<tbody>
<tr>
<td>STAT6183</td>
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<table>
<thead>
<tr>
<th>Unit description</th>
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<tr>
<td>This unit consolidates and expands upon the material on probability introduced in statistics units at 100 level. The emphasis is on the understanding of probability concepts and their application. Examples are taken from areas as diverse as biology, medicine, finance, sport, and the social and physical sciences. Topics include: the foundations of probability; probability models and their properties; some commonly used statistical distributions; relationships and association between variables; distribution of functions of random variables and sample statistics; approximations including the central limit theorem; and an introduction to the behaviour of random processes. Simulation is used to demonstrate many of these concepts.</td>
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https://unitguides.mq.edu.au/unit_offerings/139606/unit_guide/print
Important Academic Dates

Information about important academic dates including deadlines for withdrawing from units are available at [https://students.mq.edu.au/important-dates](https://students.mq.edu.au/important-dates)

Learning Outcomes

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

**ULO1:** Analyse probability and conditional probability of an event by applying a probabilistic model for an experiment.

**ULO2:** Apply a range of strategies to find and interpret the moments of discrete and continuous random variables including their expected values and variances.

**ULO3:** Apply the Law of Large Numbers (LLN) and the Central Limit Theorem (CLT) to find asymptotic distribution of a sample mean

**ULO4:** Analyse a bivariate probability distribution to find and interpret corresponding covariances, correlations, marginal and conditional probability distributions.

**ULO5:** Apply Markov Chain (MC) theory to practical problems and tasks.

General Assessment Information

**ASSIGNMENT SUBMISSION:** Assignment submission will be online through the iLearn page.

Submit assignments online via the appropriate assignment link on the iLearn page. A personalised cover sheet is not required with online submissions. Read the submission statement carefully before accepting it as there are substantial penalties for making a false declaration.

- Assignment submission is via iLearn. You should upload this as a single scanned PDF file.
- Please note the quick guide on how to upload your assignments provided on the iLearn page.
- Please make sure that each page in your uploaded assignment corresponds to only one A4 page (do not upload an A3 page worth of content as an A4 page in landscape). If you are using an app like Clear Scanner, please make sure that the photos you are using are clear and shadow-free.
- It is your responsibility to make sure your assignment submission is legible.
- If there are technical obstructions to your submitting online, please email us to let us know.

You may submit as often as required prior to the due date/time. Please note that each submission will completely replace any previous submissions. It is in your interests to make frequent submissions of your partially completed work as insurance against technical or other
problems near the submission deadline.

LATE SUBMISSION OF WORK: All assessment tasks must be submitted by the official due date and time. In the case of a late submission for a non-timed assessment (e.g. an assignment), if special consideration has NOT been granted, 20% of the earned mark will be deducted for each 24-hour period (or part thereof) that the submission is late for the first 2 days (including weekends and/or public holidays). For example, if an assignment is submitted 25 hours late, its mark will attract a penalty equal to 40% of the earned mark. After 2 days (including weekends and public holidays) a mark of 0% will be awarded. Timed assessment tasks (e.g. tests, examinations) do not fall under these rules.

FINAL EXAM POLICY: It is Macquarie University policy not to set early examinations for individuals or groups of students. All students are expected to ensure that they are available until the end of the teaching semester, that is, the final day of the official examination period. The only excuse for not sitting an examination at the designated time is because of documented illness or unavoidable disruption. In these special circumstances, you may apply for special consideration via ask.mq.edu.au.

If you receive special consideration for the final exam, a supplementary exam will be scheduled in the interval between the regular exam period and the start of the next session. By making a special consideration application for the final exam you are declaring yourself available for a resit during this supplementary examination period and will not be eligible for a second special consideration approval based on pre-existing commitments. Please ensure you are familiar with the policy prior to submitting an application.

Assessment Tasks

<table>
<thead>
<tr>
<th>Name</th>
<th>Weighting</th>
<th>Hurdle</th>
<th>Due</th>
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<tbody>
<tr>
<td>Test 1</td>
<td>15%</td>
<td>No</td>
<td>Week 4</td>
</tr>
<tr>
<td>Test 2</td>
<td>15%</td>
<td>No</td>
<td>Week 8</td>
</tr>
<tr>
<td>Assignment</td>
<td>20%</td>
<td>No</td>
<td>Week 12</td>
</tr>
<tr>
<td>Final Exam</td>
<td>50%</td>
<td>No</td>
<td>University Examination Period</td>
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Test 1

Assessment Type 1: Quiz/Test
Indicative Time on Task 2: 1 hours
Due: Week 4
Weighting: 15%

50-minute test
On successful completion you will be able to:

- Analyse probability and conditional probability of an event by applying a probabilistic model for an experiment.
- Apply a range of strategies to find and interpret the moments of discrete and continuous random variables including their expected values and variances.

### Test 2

Assessment Type 1: Quiz/Test  
Indicative Time on Task 2: 1 hours  
Due: **Week 8**  
Weighting: **15%**

50-minute test

On successful completion you will be able to:

- Analyse probability and conditional probability of an event by applying a probabilistic model for an experiment.
- Apply a range of strategies to find and interpret the moments of discrete and continuous random variables including their expected values and variances.
- Apply the Law of Large Numbers (LLN) and the Central Limit Theorem (CLT) to find asymptotic distribution of a sample mean.

### Assignment

Assessment Type 1: Quantitative analysis task  
Indicative Time on Task 2: 10 hours  
Due: **Week 12**  
Weighting: **20%**

Students will be given two weeks to complete the assignment.

On successful completion you will be able to:

- Analyse probability and conditional probability of an event by applying a probabilistic model for an experiment.
- Apply a range of strategies to find and interpret the moments of discrete and continuous random variables including their expected values and variances.
random variables including their expected values and variances.

- Apply the Law of Large Numbers (LLN) and the Central Limit Theorem (CLT) to find asymptotic distribution of a sample mean
- Analyse a bivariate probability distribution to find and interpret corresponding covariances, correlations, marginal and conditional probability distributions.

Final Exam
Assessment Type 1: Examination
Indicative Time on Task 2: 2 hours
Due: University Examination Period
Weighting: 50%

Formal invigilated examination testing the learning outcomes of the unit.

On successful completion you will be able to:
- Analyse probability and conditional probability of an event by applying a probabilistic model for an experiment.
- Apply a range of strategies to find and interpret the moments of discrete and continuous random variables including their expected values and variances.
- Apply the Law of Large Numbers (LLN) and the Central Limit Theorem (CLT) to find asymptotic distribution of a sample mean
- Analyse a bivariate probability distribution to find and interpret corresponding covariances, correlations, marginal and conditional probability distributions.
- Apply Markov Chain (MC) theory to practical problems and tasks.

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 Learning Skills Unit 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

Technology Used and Required

The unit is delivered by lectures (2 hours per week, starting in Week 1) and SGTAs (1 hour per week, starting in Week 2). All teaching material will be available on iLearn.

SGTA exercises will be available from iLearn prior to the SGTA. Students are expected to have attempted these prior to the SGTA. Solutions will be explained, with emphasis on any area students had trouble with. At the end of the week, these solutions will then be placed on iLearn.

Windows (especially Excel), R and Wolfram Alpha will be used in the unit.

Required and Recommended Texts and/or Materials

There is no required textbook for this unit. Students may benefit from having access to the following background reference for additional reading and problems:

- Wackerly, D. D., Mendenhall, W., Scheaffer, R. L. Mathematical Statistics with Applications (4th,5th, 6th or 7th Editions)

The following books may also be useful background references:

- Ross, S. A First Course in Probability, Pearson (5th, 6th, 7th, 9th or 9th Editions)

Unit Schedule

<table>
<thead>
<tr>
<th>Topic</th>
<th>Material Covered</th>
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<tbody>
<tr>
<td>1</td>
<td>Experiments, sample spaces, Probability Rules, Permutations and Combinations.</td>
</tr>
<tr>
<td>4</td>
<td>Important Discrete Distributions: Bernoulli, Binomial, Geometric and Poisson.</td>
</tr>
<tr>
<td>5</td>
<td>Moment generating functions. Discrete Distributions: Negative Binomial and Hypergeometric.</td>
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### 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.)**

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/admin/other-resources/student-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

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 help you improve your marks and take control of your study.

• Getting help with your assignment
• Workshops
• StudyWise
• 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 Enquiry Service

For all student enquiries, visit Student Connect at ask.mq.edu.au

If you are a Global MBA student contact globalmba.support@mq.edu.au

Equity 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.

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.