



STAT175

Gambling, Sport and Medicine

S1 Evening 2014

Statistics

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General Information

Unit convenor and teaching staff

Unit Convenor

Kj Byun

kj.byun@mq.edu.au

Contact via kj.byun@mq.edu.au

Other Staff

Peter Petocz

peter.petocz@mq.edu.au

Contact via peter.petocz@mq.edu.au

Credit points

3

Prerequisites

Corequisites

Co-badged status

Unit description

This is a general education unit and recommended for students in all fields of study. There is no assumed knowledge. It is particularly useful for those seeking a better understanding of statistics, using attractive and relevant ideas from areas of popular interest. The unit includes analysis of popular gambling games; the chance of success is calculated along with the testing of various strategies for winning. Statistics also plays an important role in the development of sporting strategies and certain national sports are examined. The use of statistics in the important field of medical science is covered. Ethical aspects of gambling, sport and medicine 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:

Explain the meaning of common statistical terms that appear in gambling, sport and medicine

Apply a range of statistical and probability techniques in these and other areas

Use a spreadsheet and a statistical computer package to carry out statistical investigations

Communicate the results of your statistical investigations clearly

Discuss the role that statistics plays in gambling, sporting performance and medical studies

Discuss ethical problems raised by the use of statistics in gambling, sport and medicine

Continue any future statistical studies with increased confidence

Assessment Tasks

| Name | Weighting | Due |
|-------------------------------------|-----------|-----------------------|
| <u>Attendance and Participation</u> | 12% | Weekly (Wednesday) |
| <u>Labs</u> | 8% | Weekly (Wednesday) |
| <u>Assignment 1</u> | 10% | 8th April (week 6) |
| <u>Assignment 2</u> | 10% | 3rd June (week 12) |
| <u>Final Examination</u> | 60% | 16 June - 4 July 2014 |

Attendance and Participation

Due: **Weekly (Wednesday)**

Weighting: **12%**

To obtain full marks you need to attend the class on time and participate in every practical. Your mobile phone must be switched off and kept out of sight for the entire duration of your class.

Any late arrival, early departure, inappropriate usage of the computer, disturbing behaviour including the use of mobile phones will incur deduction in marks.

On successful completion you will be able to:

- Apply a range of statistical and probability techniques in these and other areas
- Use a spreadsheet and a statistical computer package to carry out statistical investigations
- Communicate the results of your statistical investigations clearly
- Discuss ethical problems raised by the use of statistics in gambling, sport and medicine
- Continue any future statistical studies with increased confidence

Labs

Due: **Weekly (Wednesday)**

Weighting: **8%**

Prior to your practical class, please prepare by revising the relevant lecture material and be sure to bring your lecture notes to your practical class. These lab works completed during the practical class must be submitted to your tutor by the end of your practical session for formal marking. There may be extra questions asked at the practical session in addition to the ones on the sheets.

In order to give early assessment feedback to the students by the end of week 4 (according to the university's assessment policy) markedlab 2 exercises will be handed back during your practical session in week 4.

Some of the practical lab exercises are carried out using Excel, others using Minitab; you should install a copy of Minitab onto your own computer (download from the Student Portal).

On successful completion you will be able to:

- Explain the meaning of common statistical terms that appear in gambling, sport and medicine
- Apply a range of statistical and probability techniques in these and other areas
- Use a spreadsheet and a statistical computer package to carry out statistical investigations
- Communicate the results of your statistical investigations clearly
- Discuss the role that statistics plays in gambling, sporting performance and medical studies

Assignment 1

Due: **8th April (week 6)**

Weighting: **10%**

*Your assignment must be **word-processed** or it will not be marked.* The presentation of the layout of your assignment will have some bearing on the mark you receive.

You should hand the assignments in at the Science Student Centre, E7A102, together with a cover sheet downloaded from:

http://web.science.mq.edu.au/new_and_current_students/undergrad/assignments_and_coversheets/

The absolute deadline is 2pm (the assignment box at the Science Student Centre will close at 2pm) Tuesday 8th of April in week 6.

No extension will be granted. Students who have not submitted the assignment prior to the deadline will be awarded a mark of 0 for the assignment, except for cases in which an application

for special consideration is made and approved.

Marked assignments will be returned to students during a following practical, and the tutor will give detailed feedback on the assignment during that class.

These solutions will *not* be available elsewhere (will not be published on iLearn) and so it is in your best interest to attend and pay attention in the practical.

The assignments are meant to be a learning device as well as being an assessment task and a reasonable attempt at each question is expected. It is *not* worthwhile to copy the solutions from somebody else or plagiarise by other means. Please note that if you provide your work to someone else and it is copied then you are also considered to be just as guilty of plagiarism as the other party.

Each semester, many students receive a mark of 0 for their Assignment submission, due to plagiarism. You may discuss solution approaches with your fellow students, but you must not share any files, wording or text. Do the work alone, starting with a new empty document.

Please read the section on plagiarism in the unit outline and the relevant university website specified, very carefully. You should ensure, however, that you take careful note of any solutions provided in the practical session.

On successful completion you will be able to:

- Explain the meaning of common statistical terms that appear in gambling, sport and medicine
- Apply a range of statistical and probability techniques in these and other areas
- Communicate the results of your statistical investigations clearly
- Discuss the role that statistics plays in gambling, sporting performance and medical studies
- Discuss ethical problems raised by the use of statistics in gambling, sport and medicine
- Continue any future statistical studies with increased confidence

Assignment 2

Due: **3rd June (week 12)**

Weighting: **10%**

*Your assignment must be **word-processed** or it will not be marked. The presentation of the layout of your assignment will have some bearing on the mark you receive.*

You should hand the assignments in at the Science Student Centre, E7A102, together with a

cover sheet downloaded from:

http://web.science.mq.edu.au/new_and_current_students/undergrad/assignments_and_coversheets/

The absolute deadline is 2pm (the assignment box at the Science Student Centre will close at 2pm) Tuesday 3rd of June in week 12.

No extension will be granted. Students who have not submitted the assignment prior to the deadline will be awarded a mark of 0 for the assignment, except for cases in which an application for special consideration is made and approved.

Marked assignments will be returned to students during a following practical, and the tutor will give detailed feedback on the assignment during that class.

These solutions will *not* be available elsewhere (will not be published on iLearn) and so it is in your best interest to attend and pay attention in the practical.

The assignments are meant to be a learning device as well as being an assessment task and a reasonable attempt at each question is expected. It is *not* worthwhile to copy the solutions from somebody else or plagiarise by other means. Please note that if you provide your work to someone else and it is copied then you are also considered to be just as guilty of plagiarism as the other party.

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Please read the section on plagiarism in the unit outline and the relevant university website specified, very carefully. You should ensure, however, that you take careful note of any solutions provided in the practical session.

On successful completion you will be able to:

- Apply a range of statistical and probability techniques in these and other areas
- Use a spreadsheet and a statistical computer package to carry out statistical investigations
- Communicate the results of your statistical investigations clearly
- Discuss the role that statistics plays in gambling, sporting performance and medical studies
- Continue any future statistical studies with increased confidence

Final Examination

Due: **16 June - 4 July 2014**

Weighting: **60%**

- A 3 hour final examination for this unit will be held during the University Examination period.
- The final examination will cover all topics dealt within the unit.
- In this examination you will be provided with relevant tables but no formulae will be given. However, you will be able to bring into the examination **one piece of paper up to A4 size** on which you may **write** anything you like on **both sides**. No other notes or books are allowed.

The University Examination period in First Half Year 2014 is from Monday 16th June – Friday 4th July.

You are expected to present yourself for examination at the time and place designated in the University Examination Timetable and this includes Saturdays. The timetable will be available in Draft form approximately eight weeks before the commencement of the examinations and in final form approximately four weeks before the commencement of the examinations.

<http://www.timetables.mq.edu.au/exam/>

The only exception to not sitting an examination at the designated time is because of documented illness or unavoidable disruption. In these circumstances you may wish to consider applying for Special Consideration. Information about unavoidable disruption and the special consideration process is available at

http://www.mq.edu.au/policy/docs/special_consideration/policy.html

http://www.mq.edu.au/policy/docs/special_consideration/procedure.html

Student Request to the Faculty of Science web page for Special Consideration Applications is

http://web.science.mq.edu.au/undergraduate_programs/current/admin_central/

If a Supplementary Examination is granted as a result of the Special Consideration process the examination will be scheduled after the conclusion of the official examination period.

You are advised that 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.

On successful completion you will be able to:

- Explain the meaning of common statistical terms that appear in gambling, sport and medicine

- Apply a range of statistical and probability techniques in these and other areas
- Communicate the results of your statistical investigations clearly
- Discuss the role that statistics plays in gambling, sporting performance and medical studies

Delivery and Resources

Classes

You will have one 3-hour lecture, and you will be enrolled in one 1-hour practical class:

- Lectures: Tuesday 6pm to 9pm E7B T3 (these also contain a tutorial component)
- Practicals: Wednesday 6pm (E4B 306), 6pm (E4B 206), 7pm (E4B 306),
7pm (E4B 206), 8pm (E4B 306) and 9pm (E4B 208).

(8pm and 9pm classes may be cancelled based on enrolment)

– all practicals start in week 2

The timetable for classes can be found on the University web site at:

<http://www.timetables.mq.edu.au/>

We recommend that you attend all the lectures and all the practicals.

Attendance at the lectures is optional but may be monitored to aid in deciding the grades of those students who are close to a grade borderline or who have requested special consideration.

Attendance and participation at the practical is **compulsory** and will be monitored. Students should attend the practical they enrolled into during the enrolment period. An attendance means at least 50 minutes of attending, participating and submitting practical lab exercises. (All mobile phones must be switched off and kept out of sight)

The standard of some of these exercises covered in practicals is similar to that required in the examinations. Also during practicals in which the marked assignments are handed back to the students, the full solutions will be covered during the lab.

These solutions will not be available from anywhere else.

Required and Recommended Texts and/or Materials

We will be using the e-textbook, Kj Byun and Peter Petocz (2013). Taking Your Chances in Gambling, Sport and Medicine for lectures and also notes for practical classes. Please see

<http://www.lulu.com/content/e-book/taking-your-chances-in-gambling-sport-and-medicine/13942040>

Some other useful background references are:

- D. Rowntree (1981). *Statistics without Tears*. Penguin [QA276.R66]
- M. Bland (2000). *An Introduction to Medical Statistics*. Oxford University Press [RA409.B55/2000]
- R. Peck *et al.* (eds.) (2006). *Statistics: A Guide to the Unknown 4th Edition*. Duxbury Press [QA276.16.S843 2006]

Technology Used and Required

The Department of Statistics web page for this unit can be found at: www.stat.mq.edu.au/undergraduate_programs/stat_units/stat_units100/stat175/

(you can get there conveniently from the Department website www.stat.mq.edu.au by selecting Undergraduate programs, then Statistics Units and then Stat175).

There is an iLearn page for the unit that contains notices, lecture notes, lecture exercises, sample labs and some solutions. We will be using iLearn throughout the course.

You can access this from <https://ilearn.mq.edu.au/login/MQ/> . You will be asked for your Macquarie OneID username and password. If you have any problems, try one of the Help buttons.

If iLearn is down, you can send ordinary e-mail.

However, you should at all times use your Macquarie University student e-mail account when contacting us. E-mails from hotmail, yahoo and similar accounts are often stopped by our spam filter, so we may not get to read them. Furthermore, you should check and read your Macquarie University student e-mail on a regular basis (at least twice a week).

Teaching and Learning Strategy

Our role:

- In the 3-hour “lecture” class, we will present new material in the form of lectures, and include a tutorial component where you can practise the techniques and ask questions.
- In the practical classes, we will help you work practically, solving problems and analysing data using Microsoft Excel and Minitab.

Your role:

- We expect that you will prepare by printing and reading lecture notes in advance, attending lectures, attending practical sessions and participating in the various learning activities.
- You will work individually and in groups with your fellow students. We also expect that you will make a good attempt at the lab exercise, assignments and final examination.

Changes from Previous Offering

Of all the practical lab exercises collected and marked, 4 were chosen randomly to count towards assessment mark of 8%, However, in this offering all the practical lab exercises will count towards 8% with each lab worth 1%.

Unit Schedule

Stat175 Gambling, Sport and Medicine – Semester 1, 2014

| Date (Tuesday) | Wk | Title | Stats topics | Lab class (Wednesday) |
|---------------------------------|-----------|--------------------|--|--|
| 4 March | 1 | Lotto & Lotteries | Introduction Counting techniques | No lab first week |
| 11 March | 2 | Keno | Describing gambling games Probability intervals | 1. Lotto and combinations (Excel) |
| 18 March | 3 | Sport and binomial | Binomial distribution Olympic records | 2. Random variables and Keno (Excel) |

| | | | | |
|----------|---|--------------------|---|---|
| 25 March | 4 | Sports performance | Normal distribution Z-scores and comparisons | 3. World Cup Hockey (Excel) |
| 1 April | 5 | Health Surveys | Data types & summaries Comparing means | Lab time for assignment 1 preparation |
| 8 April | 6 | Medical studies | Types of studies Odds ratios | (Assignment 1 due Tue) 4. Pulse rates (Minitab) |
| 15 April | | Mid-semester break | | |
| 22 April | | Mid-semester break | | |
| 29 April | 7 | Roulette | House margin Chances of being ahead | 5. Births and Diabetes (Minitab) |
| 6 May | 8 | Sport and Poisson | Poisson distribution Chi-squared goodness of fit | Assignment 1 solution discussion. |

| | | | | |
|---------|----|----------------------|---|--|
| 13 May | 9 | Testing Independence | Cross tabulations Chi-square tests | 6. Soccer Goals (Excel) |
| 20 May | 10 | Sports betting | Odds and prices Bookmaking | 7. Surfing and Health (Minitab) |
| 27 May | 11 | Medical testing | Diagnostic testing | Lab time for assignment 2 preparation |
| 3 June | 12 | Forensic | Forensic Statistics | (Assignment 2 due Mon) 8. Sports betting (Excel) |
| 10 June | 13 | Summary and revision | | Assignment 2 solution discussion and revision. |

Please note in practicals from week 2 through to week 13, all practical lab exercises will be collected at the end of your practical session.

Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central](#). Students should be aware of the following policies in particular with regard to Learning and Teaching:

Academic Honesty Policy http://mq.edu.au/policy/docs/academic_honesty/policy.html

Assessment Policy <http://mq.edu.au/policy/docs/assessment/policy.html>

Grading Policy <http://mq.edu.au/policy/docs/grading/policy.html>

Grade Appeal Policy <http://mq.edu.au/policy/docs/gradeappeal/policy.html>

Grievance Management Policy http://mq.edu.au/policy/docs/grievance_management/policy.html

Disruption to Studies Policy http://www.mq.edu.au/policy/docs/disruption_studies/policy.html *The Disruption to Studies Policy is effective from March 3 2014 and*

replaces the Special Consideration Policy.

In addition, a number of other policies can be found in the [Learning and Teaching Category](#) of 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/support/student_conduct/

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://informatics.mq.edu.au/help/>.

When using the University's IT, you must adhere to the [Acceptable Use Policy](#). The policy applies to all who connect to the MQ network including students.

Graduate Capabilities

Capable of Professional and Personal Judgement and Initiative

We want our graduates to have emotional intelligence and sound interpersonal skills and to demonstrate discernment and common sense in their professional and personal judgement. They will exercise initiative as needed. They will be capable of risk assessment, and be able to handle ambiguity and complexity, enabling them to be adaptable in diverse and changing environments.

This graduate capability is supported by:

Learning outcomes

- Use a spreadsheet and a statistical computer package to carry out statistical investigations
- Discuss ethical problems raised by the use of statistics in gambling, sport and medicine

Assessment tasks

- Assignment 1
- Assignment 2

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

- Explain the meaning of common statistical terms that appear in gambling, sport and medicine
- Apply a range of statistical and probability techniques in these and other areas
- Use a spreadsheet and a statistical computer package to carry out statistical investigations
- Communicate the results of your statistical investigations clearly
- Discuss the role that statistics plays in gambling, sporting performance and medical studies
- Discuss ethical problems raised by the use of statistics in gambling, sport and medicine
- Continue any future statistical studies with increased confidence

Assessment tasks

- Labs
- Assignment 1
- Assignment 2
- Final Examination

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

- Apply a range of statistical and probability techniques in these and other areas
- Use a spreadsheet and a statistical computer package to carry out statistical investigations
- Discuss the role that statistics plays in gambling, sporting performance and medical studies
- Continue any future statistical studies with increased confidence

Assessment tasks

- Attendance and Participation
- Assignment 1
- Assignment 2
- Final Examination

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

- Apply a range of statistical and probability techniques in these and other areas
- Use a spreadsheet and a statistical computer package to carry out statistical investigations
- Discuss the role that statistics plays in gambling, sporting performance and medical studies
- Discuss ethical problems raised by the use of statistics in gambling, sport and medicine
- Continue any future statistical studies with increased confidence

Assessment tasks

- Attendance and Participation
- Assignment 1
- Assignment 2
- Final Examination

Creative and Innovative

Our graduates will also be capable of creative thinking and of creating knowledge. They will be imaginative and open to experience and capable of innovation at work and in the community. We want them to be engaged in applying their critical, creative thinking.

This graduate capability is supported by:

Learning outcomes

- Communicate the results of your statistical investigations clearly
- Discuss the role that statistics plays in gambling, sporting performance and medical studies

Assessment tasks

- Attendance and Participation
- Assignment 2

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 outcome

- Discuss the role that statistics plays in gambling, sporting performance and medical studies

Assessment tasks

- Labs
- Assignment 1
- Assignment 2
- Final Examination

Engaged and Ethical Local and Global citizens

As local citizens our graduates will be aware of indigenous perspectives and of the nation's historical context. They will be engaged with the challenges of contemporary society and with knowledge and ideas. We want our graduates to have respect for diversity, to be open-minded, sensitive to others and inclusive, and to be open to other cultures and perspectives: they should have a level of cultural literacy. Our graduates should be aware of disadvantage and social justice, and be willing to participate to help create a wiser and better society.

This graduate capability is supported by:

Learning outcomes

- Apply a range of statistical and probability techniques in these and other areas
- Discuss the role that statistics plays in gambling, sporting performance and medical studies

Assessment tasks

- Attendance and Participation
- Labs
- Assignment 2
- Final Examination

Socially and Environmentally Active and Responsible

We want our graduates to be aware of and have respect for self and others; to be able to work with others as a leader and a team player; to have a sense of connectedness with others and country; and to have a sense of mutual obligation. Our graduates should be informed and active participants in moving society towards sustainability.

This graduate capability is supported by:

Learning outcomes

- Apply a range of statistical and probability techniques in these and other areas
- Discuss the role that statistics plays in gambling, sporting performance and medical studies
- Continue any future statistical studies with increased confidence

Assessment tasks

- Attendance and Participation
- Labs
- Assignment 1
- Final Examination