STAT175

Gambling, Sport and Medicine

S2 Day 2016

Dept of Statistics

Contents

General Information

Unit convenor and teaching staff
Unit Convenor and Lecturer
Kj Byun
kj.byun@mq.edu.au
Contact via kj.byun@mq.edu.au
AHH Level 2
Wedneaday 2pm - 4pm

Tutor
Alice Davey
alice.davey@mq.edu.au
Contact via contact by email
NA
NA

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

General Assessment Information

There is no "group work" assessment in this unit. All work is to be the student's own.

The lab exercises and 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 plagiarize 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 Academic Honesty Policy in the relevant university website specified under Policies and Procedures section of this unit guide, very carefully.

No extensions will be granted for assignments, except for cases where a student has a serious and unavoidable disruption to studies. In this case, an application for Disruption of Studies is required from the student on the ask.mq.edu.au system and needs to be approved by the Lecturer-In-Charge.

Assessment Tasks

Name	Weighting	Due
Attendance and participation	12%	Weekly
Labs	8%	Weekly
Assignment 1	10%	7 Sept (Week 6)
Assignment 2	10%	2 November (Week 12)

Name	Weighting	Due
Final Examination	60%	14 Nov - 2 Dec

Attendance and participation

Due: **Weekly**
Weighting: **12%**

To obtain full marks you need to attend the class on time and participate in your practical.

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
- 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**
Weighting: **8%**

These lab works completed during your practical class must be submitted to your tutor at the end of your practical session for formal marking. To obtain full marks, students should prepare, prior to their practical class, by revising the relevant lecture materials in the preceding weeks and trying the sample lab on iLearn. Also bringing lecture notes from the preceding weeks along to the class may help you further.

Some of the practical lab exercises are carried out using Microsoft 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

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

- Continue any future statistical studies with increased confidence

Assignment 1

Due: **7 Sept (Week 6)**
Weighting: **10%**

You should submit a printed copy of your assignment in at the Science & Engineering Student Centre, C7A Student Connect, together with a cover sheet downloaded from: http://web.science.mq.edu.au/new_and_current_students/undergrad/ assignments_and_coversheets/ by 2pm on the due date.

*Your assignment must be **word-processed** or it will not be marked.*

Three core criteria will be used to assess student's work:

- Knowledge development: understanding of key concepts

- Application: ability to apply quantitative and qualitative analysis methods to actual problems

- Presentation: the extent to which work has been word-processed and presented in a manner consistent with academic standard

Marked assignments will be returned to students during practical class in the following week, 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). Only a brief check answer to selected questions from the assignment will be published on iLearn.

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

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

- Continue any future statistical studies with increased confidence

Assignment 2

Due: **2 November (Week 12)**
Weighting: **10%**

You should submit a printed copy of your assignment in at the Science & Engineering Student Centre, C7A Student Connect, together with a cover sheet downloaded from: http://web.science.mq.edu.au/new_and_current_students/undergrad/ assignments_and_coversheets/ by 2pm on the due date.

*Your assignment must be **word-processed** or it will not be marked.*

Three core criteria will be used to assess student's work:

- Knowledge development: understanding of key concepts
- Application: ability to apply quantitative and qualitative analysis methods to actual problems
- Presentation: the extent to which work has been word-processed and presented in a manner consistent with academic standard

Marked assignments will be returned to students during practical class in the following week, 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). Only a brief check answer to selected questions from the assignment will be published on iLearn.

On successful completion you will be able to:
- Apply a range of statistical and probability techniques in these and other areas
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- Communicate the results of your statistical investigations clearly
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Final Examination

Due: **14 Nov - 2 Dec**
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 not be provided with formulae. However, you will be able to bring into the examination **one piece of paper up to A4 size** on which you may **handwrite** anything you like on **both sides.** No other notes or books are allowed.

The University Examination period in Session 2 Year 2016 is from Monday 14th November – Friday 2nd December.

You are expected to present yourself for examination at the time and place designated in the University Examination Timetable and this includes weekends. 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.

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 submitting a Disruption to Studies Notification. Information about unavoidable disruption and the Disruption to Studies Notification process is available at http://students.mq.edu.au/ student_admin/exams/disruption_to_studies/

If a Supplementary Examination is granted as a result of the Disruption to Studies Notification 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
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Delivery and Resources

Classes

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

- Lectures: Wednesday 11am to 2pm C5C T1 (these also contain a tutorial component)
- Practicals: Wednesday 3pm (E4B 306), 4pm (E4B 306), Thursday 12pm (E4B 206) and Thursday 1pm (E4B 206) - based on student numbers another class (Thursday 2pm (E4B 206) may be scheduled.

    – all practicals start in week 2

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

http://students.mq.edu.au/student_admin/timetables

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 around 50 minutes of attending, participating and submitting practical lab exercises. We recommend your mobile phone should be kept out of sight for the duration of the practical. Usually, students who divide their attention between their mobile phone and lab exercises run out of time to complete the work satisfactorily.

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.

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/

There is an iLearn page for the unit that contains notices, lecture notes, lecture exercises and sample labs. 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 and any announcements on iLearn on a regular basis (at least twice a week and certainly on the day of the lecture and practical).

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 practice 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.

·   We also expect that you will make a good attempt at the lab exercise, assignments and final examination.

Unit Schedule

Stat175 Gambling, Sport and Medicine – Semester 2, 2016

Date (Wed)	Wk	Title	Stats topics	Lab class (Wednesday or Thursday)
3 Aug	1	Lotto & Lotteries	Introduction Counting techniques	*No lab first week*
10 Aug	2	Keno	Describing gambling games Probability intervals	1. Lotto and combinations (Excel)
17 Aug	3	Sport and binomial	Binomial distribution Olympic records	2. Random variables and Keno (Excel)
24 Aug	4	Sports performance	Normal distribution Z-scores and comparisons	3. World Cup Hockey (Excel)

31 Aug	5	Health Surveys	Data types & summaries	Lab time for assignment 1 preparation
			Comparing means	
7 Sept	6	Medical studies	Types of studies	*(Assignment 1 due Wed)*
				4. Pulse rates (Minitab)
			Odds ratios	
14 Sept	7	Roulette	House margin	Assignment 1 solution discussion.
			Chances of being ahead	
21 Sept		Mid-semester break		
28 Sept		Mid-semester break		
5 Oct	8	Sport and Poisson	Poisson distribution	5. Births and Diabetes (Minitab)
			Chi-squared goodness of fit	
12 Oct	9	Testing Independence	Cross tabulations	6. Soccer Goals (Excel)
			Chi-square tests	
19 Oct	10	Sports betting	Odds and prices	7. Surfing and Health (Minitab)
			Bookmaking	
26 Oct	11	Medical testing	Diagnostic testing	Lab time for assignment 2 preparation
2 Nov	12	Forensic	Forensic Statistics	*(Assignment 2 due Wed)*
				8. Sports betting (Excel)
9 Nov	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

New Assessment Policy in effect from Session 2 2016 http://mq.edu.au/policy/docs/assessment/policy_2016.html. For more information visit http://students.mq.edu.au/events/2016/07/new_assessment_policy_in_place_from_session_2/

Assessment Policy prior to Session 2 2016 http://mq.edu.au/policy/docs/assessment/policy.html

Grading Policy prior to Session 2 2016 http://mq.edu.au/policy/docs/grading/policy.html

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

Complaint Management Procedure for Students and Members of the Public http://www.mq.edu.au/policy/docs/complaint_management/procedure.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/

Results

Results shown in *iLearn*, 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.

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://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.

Graduate Capabilities

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

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
- Communicate the results of your statistical investigations clearly
- Discuss ethical problems raised by the use of statistics in gambling, sport and medicine

Assessment tasks

- Assignment 1
- Assignment 2

Commitment to Continuous Learning

Our graduates will have enquiring minds and a literate curiosity which will lead them to pursue knowledge for its own sake. They will continue to pursue learning in their careers and as they participate in the world. They will be capable of reflecting on their experiences and relationships with others and the environment, learning from them, and growing - personally, professionally and socially.

This graduate capability is supported by:

Learning outcomes

- Communicate the results of your statistical investigations clearly
- Continue any future statistical studies with increased confidence

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

Assessment tasks

- Attendance and participation
- Labs
- Assignment 1
- Assignment 2
- Final Examination

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 outcomes

- Communicate the results of your statistical investigations clearly
- 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
- 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
- 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

- 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
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Assessment tasks

- Attendance and participation
- Labs
- Assignment 1

- Final Examination

Changes from Previous Offering

Some modifications have been made to the assessment structure to comply with the new Assessment Policy.