THE UNIVERSITY OF SYDNEY
Semester 1, 2017

Information Sheet for **MATH1015 Biostatistics**

Websites: It is important that you check both the Junior Mathematics website and the MATH1015 website regularly.

Junior Mathematics webpage: `http://www.maths.usyd.edu.au/u/UG/JM/`
MATH1015 webpage: `http://www.maths.usyd.edu.au/u/UG/JM/MATH1015`

Both sites may be accessed through the Learning Management System (Blackboard):

`https://elearning.sydney.edu.au`.

Important announcements relating to Junior Mathematics are posted on the Junior Mathematics page. On the MATH1015 page you will find online resources and other useful links. Announcements regarding assessment tasks will be made on this page at various times throughout the semester.

Lectures: There are 2 different lecture streams. You should attend one stream (that is, two lectures per week), as shown on your personal timetable.

Times	Location	Lecturer
8 am Mon & Tue	Eastern Avenue Auditorium	A/Prof Shelton Peiris, Carslaw 819
11 am Mon & Tue	Carslaw Lecture Theatre 159	A/Prof Jennifer Chan, Carslaw 817

Lectures run for 13 weeks. The first lecture will be on Monday 6 March. The last lecture will be on Tuesday 6 June.

Incomplete summary lecture notes: Incomplete summary lecture notes with blanks to be filled during lectures will be available on the course website. Students must print out the current week's lecture notes from the web, and bring them to your lecture to fill any missing information.

Consultation times: Consultation times will be posted on the MATH1015 webpage.

Tutorials: Tutorials (one per week) start in week 2. You should attend the tutorial given on your personal timetable. Attendance at tutorials will be recorded. Some tutorial problems are based on the computer software R.

Tutorial exercise sheets: The tutorial sheets for a given week will be available on the MATH1015 webpage. Solutions to tutorial exercises for week n will usually be posted on the web by the afternoon of the Friday of week n.

Textbook: *MATH1015 Biostatistics* (3rd Edition) – Custom Publishing for The University of Sydney,Cengage Learning (2013). Compiled by Shelton Peiris, Jennifer Chan, and Dobrin Marchev. Available from the Co-op Bookshop. See the Junior Mathematics Handbook for other references.

Assessment: Your final raw mark for this unit will be calculated as follows:

65%: Exam at end of Semester 1.
30%: Tutorial quizzes (6 quizzes worth 5% each, using the better mark principle).
2.5%: Assignment 1 mark.
2.5%: Assignment 2 mark.

The *better mark principle* means that for each quiz, the quiz counts only if it is better than or equal to your exam mark. If your quiz mark is less than your exam mark, the exam mark will be used for that portion of your assessment instead. For example, if all your quiz marks are better than your exam mark except for your quiz 2 mark then the exam will count for 70% and the assignments will count for 5% of your overall mark. The assignment marks count for 5% regardless of whether they are better than your exam mark or not.

Final grades are returned within one of the following bands:

High Distinction (HD), 85–100: representing complete or close to complete mastery of the material; **Distinction (D), 75–84:** representing excellence, but substantially less than complete mastery; **Credit (CR), 65–74:** representing a creditable performance that goes beyond routine knowledge and understanding, but less than excellence; **Pass (P), 50–64:** representing at least routine knowledge and understanding over a spectrum of topics and important ideas and concepts in the course.

A student with a passing or higher grade should be well prepared to undertake further studies in statistics which are dependent on this unit of study.

Examination: There is one examination of 1.5 hours' duration during the examination period at the end of Semester 1. Further information about the exam will be made available at a later date on the website.

Quizzes: Quizzes will be held during tutorials. You must sit for the quiz during the tutorial in which you are enrolled, unless you have a Permission Slip from the Student Services Office, issued only for verifiable reasons. Otherwise, your quiz mark may not be recorded.

Assignments: There are two assignments, which must be submitted electronically, **as PDF files only**, in Turnitin (an internet-based plagiarism-prevention service), via the Learning Management System (Blackboard) website by the deadline. Note that your assignment will not be marked if it is illegible or if it is submitted sideways or upside down. It is your responsibility to check that your assignment has been submitted correctly.

Assessment and feedback schedule:

Task	Available	Deadline/date	Latest extension*	Feedback
Quiz 1		22–24 Mar (Week 3)		Wed 29 Mar
Assignment 1	Fri 17 Mar	11:59 pm Mon 27 Mar	11:59 pm Mon 3 Apr	9 am Wed 5 Apr
Quiz 2		5–7 Apr (Week 5)		Wed 12 Apr
Quiz 3		26–28 Apr (Week 7)		Wed 3 May
Quiz 4		10–12 May (Week 9)		Wed 17 May
Assignment 2	Fri 5 May	11:59 pm Mon 15 May	11:59 pm Mon 22 May	9 am Wed 24 May
Quiz 5		24–26 May (Week 11)		Wed 31 May
Quiz 6		7–9 Jun (Week 13)		Wed 14 Jun

* Extensions for assignments are only possible for students registered with Disability Services or applying for Special Consideration or Special Arrangements.

Special consideration and special arrangements: While studying at the University of Sydney, you may need to apply for special consideration or special arrangements as follows:

Special consideration may be granted to students where well-attested illness, injury, or misadventure occurs to them (or someone they have carer's responsibility for) during the semester or the exam period. Special arrangements may be granted for essential community commitments. Further information on eligibility, document requirements, and how to apply is available at `http://sydney.edu.au/science/cstudent/ug/forms.shtml#special_consideration`. Applications must be made using the University's formal application process.

Final examinations will be held in the formal examination period. Students affected by illness, injury or misadventure may lodge a request for Special Consideration to sit a replacement examination in the formal Replacement Examination period (week 18).

If you are registered with Disability Services and would like to have adjustments applied to the replacement examination, you are required to amend your Academic Plan with Disability Services specifically for this replacement examination. This needs to be done as soon as you are notified of award of the replacement opportunity. If you have not done so, you will be allowed to sit the replacement, but under unadjusted conditions.

You should *not* submit an application of either type

- if you are absent from a tutorial and there is no assessment associated with the missed tutorial, or
- if you miss a quiz, since the better mark principle applies.

The assessment category for the assignments is "Submitted Work".

Any questions? Before you contact us with any enquiry, please check the FAQ page:

`http://www.maths.usyd.edu.au/u/UG/JM/FAQ.html`.

Where to go for help: For administrative matters, go to the *Student Services Office, Carslaw 520*. For help with mathematics, see your lecturer, your tutor, a duty tutor, or use the Ed discussion forum (`https://edstem.com.au`). Lecturers guarantee to be available during their indicated office hours, but may be available at other times as well. If you are having difficulties with mathematics due to insufficient background, you may seek help from the *Mathematics Learning Centre, Carslaw 177*. You may also email questions about the subject to `MATH1015@maths.usyd.edu.au`. Ensure that any emails that you send to this address contain your name and SID, because anonymous emails will be ignored.

Objectives: This is an introductory statistics course which aims to:

- introduce techniques for summarising experimental univariate data that arise in various branches of science, medicine, commerce etc, by means of elementary statistics, diagrams and tables;
- introduce basic probability theory to provide a mathematical framework for real life data modelling;
- introduce a number of discrete and continuous distributions and their applications to real life problems;
- introduce statistical inference and show how statistical tests can provide evidence for or against a scientific question;
- introduce bivariate data analysis, correlation, simple linear regression and related problems with applications;
- introduce categorical data analysis, contingency tables, goodness-of-fit tests and applications;
- introduce the freely available statistical software package R and its applications.

Outcomes: Students who successfully complete this unit should be able to:

- explain univariate and bivariate data by means of the five number summary, mean, variance and standard deviation, correlation coefficient, boxplot, histogram, scatterplot, stem-and-leaf plot and frequency distribution;
- use methods derived from the three axioms of probability to calculate the probabilities of simple events;
- understand the concept of a random variable and the meaning of the expected value and variance;
- apply the Binomial distribution as a model for discrete data, read binomial probabilities from a table, calculate binomial probabilities using R;
- use the Normal distribution as a model for continuous data, read normal probability tables, calculate normal probabilities using R;
- understand the central limit theorem;
- understand the concept of hypotheses tests and P-values for finding evidence for or against simple null hypotheses, in particular using the binomial test for testing proportions, one- or two-sided z- and t- tests for making inferences about the population mean;
- apply two-sample t-tests for making inference about two population means;

- understand the concept of a confidence interval and be able to apply it to real data;
- find the correlation coefficient and fit the least squares regression line as a way of describing a linear relationship in bivariate data;
- use the Chi-squared test for simple contingency tables and goodness-of-fit problems.
- develop basic statistical computing skills using R.

Proposed week-by-week outline:

Use *MATH1015 Biostatistics* (3rd Edition) – Custom Publishing for The University of Sydney CENGAGE Learning (2013). Compiled by Shelton Peiris, Jennifer Chan and Dobrin Marchev.

Week	**Topics from the textbook**	**Sections**
1	L1: Introduction. Stem-and-leaf plot. R Statistical Package.	1.1 – 1.2
	L2: Frequency distribution. Histogram.	1.2 – 1.3
	Measures of location and spread.	1.3, 1.4
2	L1: Five number summary, boxplot and grouped data, use of R.	1.5, 1.6, 1.7
	L2: Introduction to Probability.	2.1
3	L1: Sample space and events. Examples.	2.2
	L2: Useful Probabilistic Notation. Examples.	2.2, 2.3
4	L1: Probability rules. Independence and conditional probability.	2.4, 2.5
	L2: Discrete Probability Distributions.	3.1
5	L1: The Binomial distribution. Use of binomial tables.	3.2 – 3.4
	L2: Applications. Mean and variance of binomial distribution.	3.4 – 3.5
6	L1: Continuous Probability Distributions. The normal distribution.	4.1, 4.2.1 – 3
	L2: The normal table. Sum of independent normal variables.	4.3 – 4.5
7	L1: Estimation. Estimation of the mean.	5.1
	Central Limit Theorem (CLT).	5.2
	L2: t distribution. Confidence Interval (CI) for the Mean. (Omit 6.6.)	5.3 – 5.5
	CI for the Binomial parameter p.	5.6
8	L1: Hypothesis Testing: Introduction to hypothesis testing. P-values.	6.1 – 6.2
	L2: One-sample test for the mean.	6.3 – 6.5
9	L1: One-sample test for a proportion.	6.6
	L2: Paired-sample t-test. (Omit 8.3.)	8.1 – 8.2
10	L1: Two-sample t-test for independent samples.	8.4
	CI for the difference of the means from two independent samples.	8.5
	L2: Two-sample test for binomial proportions.	10.1 – 10.2
11	L1: Categorical Data.	10.2
	$R \times C$ Contingency Tables.	10.6
	L2: Chi-Square Goodness-of-Fit Test. Applications. (Omit 10.8.)	10.7
12	L1: Regression and Correlation. (Omit 11.4, 11.5.)	11.1 – 11.3
	L2: Assessing the Goodness of Fit of Regression Lines.	11.6
13	L1: The Correlation Coefficient. Applications to Regression.	11.7
	(Omit 11.8 – 11.13.)	
	L2: Revision.	