Unit Outline
STAT1002 Statistical Data Analysis
Semester 1, 2016

Unit study package code: STAT1002
Mode of study: Internal
Tuition pattern summary: Note: For any specific variations to this tuition pattern and for precise information refer to the Learning Activities section.
Lecture: 1 x 2 Hours Weekly
Workshop: 1 x 1 Hours Weekly
This unit does not have a fieldwork component.
Credit Value: 12.5
Pre-requisite units: Nil
Co-requisite units: Nil
Anti-requisite units: Nil
Result type: Grade/Mark
Approved incidental fees: Information about approved incidental fees can be obtained from our website. Visit fees.curtin.edu.au/incidental_fees.cfm for details.
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Administrative contact: Name: Jeannie Darmago
Phone: +618 9266 3534
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Location: Building: 314 - Room: 345
Learning Management System: Blackboard (lms.curtin.edu.au)
Acknowledgement of Country
We respectfully acknowledge the Indigenous Elders, custodians, their descendants and kin of this land past and present.

Syllabus
This unit serves as an introduction to the broad world of statistics by looking at the concepts of descriptive statistics and inferential statistics. From raw data to useful information - students will learn to look at a data set from different perspectives and develop practical solutions to the associated problem. Topics that will be covered include: univariate statistics; exploratory data analysis; numerical and graphical summaries; transformations of univariate data; normal distribution and associated probability calculations; checks for normality; design of experiments; random sampling; central limit theorem; inference for single mean; inference on two means: paired case and independent case; analysis of variance; graphical evaluation and basic regression analysis of bivariate data. Students will also learn to analyse data using SPSS or R - real world software package used in various disciplines and industries world-wide.

Introduction
This unit is an introduction to methods of statistical analysis and their role scientific inference - drawing conclusions about the world using data. The content is divided into two parts: descriptive statistics and inferential statistics, but throughout the unit, we will emphasize that how data are collected determines the nature of the conclusions that we are entitled to draw from any study. At the end of the unit, students will be on their way to becoming statistically literate citizens who can start to evaluate claims in the media and from other sources with a critical eye and a healthy skepticism.

Unit Learning Outcomes
All graduates of Curtin University achieve a set of nine graduate attributes during their course of study. These tell an employer that, through your studies, you have acquired discipline knowledge and a range of other skills and attributes which employers say would be useful in a professional setting. Each unit in your course addresses the graduate attributes through a clearly identified set of learning outcomes. They form a vital part in the process referred to as assurance of learning. The learning outcomes tell you what you are expected to know, understand or be able to do in order to be successful in this unit. Each assessment for this unit is carefully designed to test your achievement of one or more of the unit learning outcomes. On successfully completing all of the assessments you will have achieved all of these learning outcomes.

Your course has been designed so that on graduating we can say you will have achieved all of Curtin’s Graduate Attributes through the assurance of learning process in each unit.

<table>
<thead>
<tr>
<th>On successful completion of this unit students can:</th>
<th>Graduate Attributes addressed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Identify the role of statistics and apply statistical data analysis techniques, given in the unit content, to a variety of practical problems in your own and related discipline areas. Apply statistical methods for exploring, summarising and presenting different types of data</td>
<td>✔️</td>
</tr>
<tr>
<td>2 Identify the role of design of experiments and sampling in acquiring data, formulate data analysis problem in a statistical framework and decide on appropriate statistical inference procedure to use. Apply the appropriate statistical inference procedure to a given set of data, interpret the results of the statistical procedure and make statistical decisions and conclusions</td>
<td>✔️</td>
</tr>
<tr>
<td>3 Exhibit a high level of confidence in using a statistical package to perform statistical procedures, given in the unit content, and use the outputs from the procedures to make statistical inferences</td>
<td>✔️</td>
</tr>
</tbody>
</table>
Curtin’s Graduate Attributes

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apply discipline knowledge</td>
<td>Thinking skills</td>
</tr>
<tr>
<td>Communication skills</td>
<td>Technology skills</td>
</tr>
<tr>
<td>International perspective</td>
<td>Information skills</td>
</tr>
<tr>
<td>(value the perspectives of others)</td>
<td>(use analytical skills to solve problems)</td>
</tr>
<tr>
<td></td>
<td>(confidence to investigate new ideas)</td>
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<tr>
<td></td>
<td>Learning how to learn</td>
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<td></td>
<td>(apply principles learnt to new situations)</td>
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<td></td>
<td>(confidence to tackle unfamiliar problems)</td>
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<td></td>
<td>Professional Skills</td>
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<tr>
<td></td>
<td>(work independently and as a team)</td>
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<tr>
<td></td>
<td>(plan own work)</td>
</tr>
<tr>
<td>Cultural understanding</td>
<td>(value the perspectives of others)</td>
</tr>
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<td></td>
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</tbody>
</table>

Find out more about Curtin’s Graduate attributes at the Office of Teaching & Learning website: ctl.curtin.edu.au

Learning Activities

1. One 2-hour lecture per week
2. Weekly workshop in a computer laboratory consisting of:
   - problem-solving
   - learning how to use statistical software
   - activities
3. Weekly on-line quizzes
4. Two in-class tests on lecture and workshop material

Learning Resources

Library Reserve

There are resources for this unit in the library Reserve collection. To access these resources, please click on the following link:

http://link.library.curtin.edu.au/primo/course?STAT1002

Essential texts

The required textbook(s) for this unit are:


Copies of the textbook are available from the University Bookshop, and there will also be a several copies placed on reserve at the University Library.

(ISBN/ISSN: 9781464151811)

Other resources

Students are not required to purchase the following resources, but may wish to consult them for supplementary information. Where electronic version are available, a hyperlink to University Library resources will be made available to students below and through Blackboard.

Assessment

Assessment schedule

<table>
<thead>
<tr>
<th>Task</th>
<th>Value %</th>
<th>Date Due</th>
<th>Unit Learning Outcome(s) Assessed</th>
</tr>
</thead>
</table>
| Test 1 of 2           | 15 percent | **Week:** Teaching Week 5  
**Day:** During lecture or workshop  
**Time:** TBA | 1,2,3                             |
| Test 2 of 2           | 15 percent | **Week:** Teaching Week 11  
**Day:** During lecture or workshop  
**Time:** TBA | 1,2,3                             |
| Online Quizzes        | 20 percent | **Week:** Teaching Weeks 1-12  
**Day:** TBA  
**Time:** TBA | 1,2                             |
| Final Examination      | 50 percent | **Week:** Semester 1, 2016 Examination Period (13 - 24 June)  
**Day:** TBA  
**Time:** TBA | 1,2,3                             |

Detailed information on assessment tasks

1. Test 1 covers material from Teaching Weeks 1 to 4. It will be held either during the lecture or during your workshop.
2. Test 2 covers material from Teaching Weeks 5 to 10. It will be held either during the lecture or during your workshop.
3. There are on-line quizzes (worth 20%) starting in the first week. The due date for each quiz is given on the quiz itself. You can access these quizzes through the Statistical Data Analysis section of Blackboard: click on Online Quizzes. This is a link to the (AiM) web server that hosts the quizzes. Each quiz (except the first quiz) tests any work covered up to the week before its due date. Another link in the menu in Blackboard is Online Quiz Info (easy-to-navigate information describing how the AiM (Online) Quizzes work; please read this before you attempt any of the quizzes. Note that if Blackboard is down the online quizzes may be accessed directly via http://aim04.curtin.edu.au

Any queries regarding the quizzes may be emailed to maths-aim@lists.curtin.edu.au (there are links within AiM for this). Please make the subject of such queries something like: SDA Quiz 4 Q 3. Dr Greg Gamble (room 314.353) will promptly respond to your queries. Most responses will also be blogged at a page that is accessible from the AiM homepage. So, you should check the blog in case someone else has had a similar query you were about to pose and the response given also helps you. (Unfortunately, the Discussion Board forum for this has become impractical, and has been discontinued.) Note that your AiM Online quiz password is not the same as your OASIS/Blackboard password (read Online Quiz Info!).

4. A two-hour final examination will take place during the University Examination Period (13 - 24 June). Students will be informed before the end of semester what aids are allowed during the examination.

Pass requirements

To pass this unit, students must achieve a final mark of 50 or greater.

Fair assessment through moderation
Moderation describes a quality assurance process to ensure that assessments are appropriate to the learning outcomes, and that student work is evaluated consistently by assessors. Minimum standards for the moderation of assessment are described in the Assessment and Student Progression Manual, available from policies.curtin.edu.au/policies/teachingandlearning.cfm

Late assessment policy
This ensures that the requirements for submission of assignments and other work to be assessed are fair, transparent, equitable, and that penalties are consistently applied.

1. All assessments students are required to submit will have a due date and time specified on this Unit Outline.
2. Students will be penalised by a deduction of ten percent per calendar day for a late assessment submission (eg a mark equivalent to 10% of the total allocated for the assessment will be deducted from the marked value for every day that the assessment is late). This means that an assessment worth 20 marks will have two marks deducted per calendar day late. Hence if it was handed in three calendar days late and given a mark of 16/20, the student would receive 10/20. An assessment more than seven calendar days overdue will not be marked and will receive a mark of 0.

Assessment extension
A student unable to complete an assessment task by/on the original published date/time (eg examinations, tests) or due date/time (eg assignments) must apply for an assessment extension using the Assessment Extension form (available from the Forms page at students.curtin.edu.au/administration/) as prescribed by the Academic Registrar. It is the responsibility of the student to demonstrate and provide evidence for exceptional circumstances beyond the student’s control that prevent them from completing/submitting the assessment task.

The student will be expected to lodge the form and supporting documentation with the unit coordinator before the assessment date/time or due date/time. An application may be accepted up to five working days after the date or due date of the assessment task where the student is able to provide an acceptable explanation as to why he or she was not able to submit the application prior to the assessment date. An application for an assessment extension will not be accepted after the date of the Board of Examiners’ meeting.

Deferred assessments
If your results show that you have been granted a deferred assessment you should immediately check your OASIS email for details.

Deferred examinations/tests will be held from 18/07/2016 to 22/07/2016. Notification to students will be made after the Board of Examiners’ meeting via the Official Communications Channel (OCC) in OASIS.

Supplementary assessments
Supplementary assessments, if granted by the Board of Examiners, will have a due date or be held between 18/07/2016 and 22/07/2016. Notification to students will be made after the Board of Examiners’ meeting via the Official Communications Channel (OCC) in OASIS.

It is the responsibility of students to be available to complete the requirements of a supplementary assessment. If your results show that you have been granted a supplementary assessment you should immediately check your OASIS email for details.

Referencing style
The referencing style for this unit is APA 6th Ed.
More information can be found on this style from the Library web site: http://libguides.library.curtin.edu.au/referencing.

Copyright
© Curtin University. The course material for this unit is provided to you for your own research and study only. It is
Academic Integrity (including plagiarism and cheating)

Any conduct by a student that is dishonest or unfair in connection with any academic work is considered to be academic misconduct. Plagiarism and cheating are serious offences that will be investigated and may result in penalties such as reduced or zero grades, annulled units or even termination from the course.

Plagiarism occurs when work or property of another person is presented as one’s own, without appropriate acknowledgement or referencing. Submitting work which has been produced by someone else (e.g. allowing or contracting another person to do the work for which you claim authorship) is also plagiarism. Submitted work is subjected to a plagiarism detection process, which may include the use of text matching systems or interviews with students to determine authorship.

Cheating includes (but is not limited to) asking or paying someone to complete an assessment task for you or any use of unauthorised materials or assistance during an examination or test.

From Semester 1, 2016, all incoming coursework students are required to complete Curtin’s Academic Integrity Program (AIP). If a student does not pass the program by the end of their first study period of enrolment at Curtin, their marks will be withheld until they pass. More information about the AIP can be found at: https://academicintegrity.curtin.edu.au/students/AIP.cfm

Refer to the Academic Integrity tab in Blackboard or academicintegrity.curtin.edu.au for more information, including student guidelines for avoiding plagiarism.

Information and Communications Technology (ICT) Expectations

Curtin students are expected to have reliable internet access in order to connect to OASIS email and learning systems such as Blackboard and Library Services.

You may also require a computer or mobile device for preparing and submitting your work.

Students will have access to all required statistical software in computer laboratories. However, they may find it convenient to install the free, open-source R language software for statistical computing and the RStudio development environment on their own personal computers or laptops.

For general ICT assistance, in the first instance please contact OASIS Student Support: oasisapps.curtin.edu.au/help/general/support.cfm

For specific assistance with any of the items listed below, please contact The Learning Centre: life.curtin.edu.au/learning-support/learning_centre.htm

- Using Blackboard, the I Drive and Back-Up files
- Introduction to PowerPoint, Word and Excel

Additional information

UniPASS (University Peer Assisted Study Success) – Maximise your grades in this unit!

UniPASS is for ALL students, no matter what your level – free, collaborative group study sessions, run by trained, successful students. You can increase your grades by over 10% by attending regularly! (that is a PASS to a CREDIT, or a DISTINCTION to a HIGH DISTINCTION) Make friends, make connections and maximise your grades - Go to the Blackboard page for this unit and see the UniPASS link for the timetable – no registration necessary, just turn up! Search “unipass” on the Curtin website, or contact unipass@curtin.edu.au for more information. Sessions start in week 2, places are limited so get there early!

Enrolment

It is your responsibility to ensure that your enrolment is correct - you can check your enrolment through the eStudent option on OASIS, where you can also print an Enrolment Advice.
Student Rights and Responsibilities

It is the responsibility of every student to be aware of all relevant legislation, policies and procedures relating to their rights and responsibilities as a student. These include:

- the Student Charter
- the University's Guiding Ethical Principles
- the University's policy and statements on plagiarism and academic integrity
- copyright principles and responsibilities
- the University's policies on appropriate use of software and computer facilities

Information on all these things is available through the University's "Student Rights and Responsibilities" website at: students.curtin.edu.au/rights.

Student Equity

There are a number of factors that might disadvantage some students from participating in their studies or assessments to the best of their ability, under standard conditions. These factors may include a disability or medical condition (e.g. mental illness, chronic illness, physical or sensory disability, learning disability), significant family responsibilities, pregnancy, religious practices, living in a remote location or another reason. If you believe you may be unfairly disadvantaged on these or other grounds please contact Student Equity at eesi@curtin.edu.au or go to http://eesj.curtin.edu.au/student_equity/index.cfm for more information.

You can also contact Counselling and Disability services: http://www.disability.curtin.edu.au or the Multi-faith services: http://life.curtin.edu.au/health-and-wellbeing/about_multifaith_services.htm for further information.

It is important to note that the staff of the university may not be able to meet your needs if they are not informed of your individual circumstances so please get in touch with the appropriate service if you require assistance. For general wellbeing concerns or advice please contact Curtin's Student Wellbeing Advisory Service at: http://life.curtin.edu.au/health-and-wellbeing/student_wellbeing_service.htm

Recent unit changes

Students are encouraged to provide unit feedback through eVALUate, Curtin's online student feedback system. For more information about eVALUate, please refer to evaluate.curtin.edu.au/info/.

To view previous student feedback about this unit, search for the Unit Summary Report at https://evaluate.curtin.edu.au/student/unit_search.cfm. See https://evaluate.curtin.edu.au/info/dates.cfm to find out when you can eVALUate this unit.

Recent changes to this unit include:

1. Some use of statistical software will be assessed in Tests 1 and 2.
Program calendar
Program Calendar – Semester 2, 2015

NB The ordering of, and emphasis on, individual topics may change slightly during the semester

<table>
<thead>
<tr>
<th>Teaching Week</th>
<th>Begin Date</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orientation</td>
<td>22 February</td>
<td>Orientation Week</td>
</tr>
<tr>
<td>1</td>
<td>29 February</td>
<td>Introduction and overview; role of statistics; numerical and graphical summaries; terminology; sampling [Ch. 1, 2]</td>
</tr>
<tr>
<td>2</td>
<td>7 March</td>
<td>Numerical and graphical summaries (continued); random sampling; detecting outliers; density curves [Ch. 2, 3]</td>
</tr>
<tr>
<td>3</td>
<td>14 March</td>
<td>Random sampling (continued); describing variability; density curves (continued); Normal distribution; elementary probability [Ch. 3, 8, 11]</td>
</tr>
<tr>
<td>4</td>
<td>21 March</td>
<td>Introduction to sampling distribution of a proportion; introduction to statistical inference [Ch. 15, 16]</td>
</tr>
<tr>
<td></td>
<td>28 March</td>
<td>Tuition-free Week</td>
</tr>
<tr>
<td>5</td>
<td>4 April</td>
<td>TEST 1: Confidence intervals for proportions (continued); interpretation of confidence intervals [Ch. 16]</td>
</tr>
<tr>
<td>6</td>
<td>11 April</td>
<td>Sampling distribution of the mean; inference about a population mean; [Ch. 19, 20]</td>
</tr>
<tr>
<td></td>
<td>18 April</td>
<td>Tuition-free Week</td>
</tr>
<tr>
<td>7</td>
<td>25 April</td>
<td>Inference about a population mean (continued); confidence intervals using the t-distribution; introduction to hypothesis testing [Ch. 20]</td>
</tr>
<tr>
<td>8</td>
<td>2 May</td>
<td>Hypothesis testing (continued); comparing two means [Ch. 20, 21]</td>
</tr>
<tr>
<td>9</td>
<td>9 May</td>
<td>Comparing two means (continued) - hypothesis testing and confidence intervals [Ch. 21]</td>
</tr>
<tr>
<td>10</td>
<td>16 May</td>
<td>Comparing several means - ANOVA; introduction to regression and correlation; fitting linear models using least squares [Ch. 26, 4, 25]</td>
</tr>
<tr>
<td>11</td>
<td>23 May</td>
<td>TEST 2: Fitting linear models (continued); analysis of variance; diagnostic checking [Ch. 25]</td>
</tr>
<tr>
<td>12</td>
<td>30 May</td>
<td>Inference for linear models; prediction from linear models; exam revision [Ch. 25]</td>
</tr>
<tr>
<td></td>
<td>6 June</td>
<td>Study Week</td>
</tr>
<tr>
<td></td>
<td>13 June</td>
<td>Examinations</td>
</tr>
<tr>
<td></td>
<td>20 June</td>
<td>Examinations</td>
</tr>
</tbody>
</table>