



Course Code:	1014SCG
Course Name:	Statistics
Semester:	Trimester 3, 2018
Program:	Diploma of Science
	Mixed English & Academic Program
Credit Points:	10
Course Coordinator:	Rebecca Fox
Document modified:	26 <sup>th</sup> September, 2018

### Teaching Team

Your lecturer/tutor can be contacted via the email system on the portal.

Name	Email
Rebecca Fox	<a href="mailto:rebecca.fox@staff.griffithcollege.edu.au">rebecca.fox@staff.griffithcollege.edu.au</a>

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### Staff Consultation

Your lecturer/tutor is available each week for consultation outside of normal class times. Times that your lecturer/tutor will be available for consultation will be given in the first week

of lectures. A list of times and rooms will be published on the Griffith College Portal under the “myTimetable” link.

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### Prerequisites

There are no prerequisites for this course

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### Brief Course Description

This course aims to provide students with both an understanding of the statistical paradigm and a general knowledge of basic statistical techniques as applicable to the Science.

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### Rationale

An appropriate knowledge of the concepts and principles of statistical techniques and the application of these techniques to the analysis of data is essential in modern scientific practice. These concepts and principles provide the basis for the analysis of all scientific experimentation and the investigation of the natural and technological worlds. The course provides students with knowledge and skills that will equip them to perform analysis of experimental results, which will be utilised in most of their higher-level courses.

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### Aims

This course will provide an introduction to the use of a statistical computer package (SPSS) to explore patterns based on “realistic” data sets. A major aim of this course is for the student to not only master effective use of statistical data analysis techniques but also for the student to interpret and communicate statistical output within a scientific report format. In addition, the student will develop and apply skills in “desk research” (information search, discovery and collation) in the preparation of this scientific report. This course aims to develop generic skills in 1) written communication, 2) problem solving, 3) quantitative analysis, and 4) qualitative methodologies. Written communication skills, problem solving skills, and qualitative methods are developed within a framework of the research project (scientific report on a selected research topic). Problem solving and quantitative skills are developed using multiple whole semester tasks throughout the semester. These tasks are an aid in providing feedback to students about their understanding of the fundamental concepts in the course. An end of semester exam is used to assess the understanding of statistical concepts studied in this course.

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### Learning Outcomes

Students will gain quantitative and problem solving skills, which will be tested through

assessment items and end of semester examination. Students will learn basic skills in written communication and teamwork through a semester-long group project.

Upon successful completion of this course students will be able to...

- 1 Produce, evaluate and interpret summary statistics and graphics appropriate to a specific research question and the characteristics of a given data set.
  - 2 Be familiar with various population probability distributions and be able to recognise the appropriate underlying distribution for particular methods of analyses and hypothesis testing
  - 3 Apply the appropriate statistical test for a given experimental design (e.g. t-test, ANOVA, regression, etc.)
  - 4 Apply the appropriate statistical test for categorical data sets (e.g. chi-squared test)
  - 5 Demonstrate a working knowledge of the basics of The Research Method and its relationship to statistical inference
  - 6 Understand the framework of statistical inference (estimation and hypothesis testing) based on random samples
  - 7 Understand experimental design concepts, as they relate to the statistical models and hypotheses;
  - 8 Demonstrate an ability to effectively interpret and communicate statistical output from commonly used statistical software
  - 9 Determine appropriate statistical summaries and analytical methods and apply these to a given research problem; perform analyses using statistical software; interpret results of the analyses.
  - 10 Students will be able to synthesise and communicate the aims, methods, results and interpretation in the format of a statistical report.
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#### Texts and Supporting Materials

D'Agostino, R. B. Sr., L. M. Sullivan, & Beiser, A. S. (2006). *Introductory Applied Biostatistics*. Belmont, Thomson Brooks/Cole.

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#### Organisation and Teaching Strategies

Lectures: Three one-hour lectures per week for 12 weeks.

Tutorials: One two-hour Tutorial per week for 12 weeks.

Methods are presented in lectures and their application demonstrated using examples taken from various areas of the sciences. Tutorials reinforce these concepts via exercises and provide the student with opportunities to discuss material both with the tutor and amongst themselves. Certain Tutorials will also carry an assessable component (see below). Students will review exploratory data analysis and probability while learning skills in computer software.

Inferential statistics for estimation and testing will be introduced conceptually and through the theory required for means, proportions and association. Emphasis will be on selecting and

understanding appropriate methods for real data within the context of the scientific method, and on communicating results in everyday language.

### *Class Contact Summary*

It is expected that students will attend all lectures and Tutorials:

#### **Lectures:**

Students will participate in lectures that introduce the required material and provide examples and guidance for applying newly learned techniques. Lectures will be supported by written material to which students should add information learned in lectures. This combined material together with referenced sections of the text book, will provide the guidance students need to carry out examples on their own during Tutorial sessions and in their own time. Lectures will draw on the relevant sections of the prescribed textbooks.

#### **Tutorials/Computer Laboratories:**

The Tutorials provide an important component of the learning process, in which students have the opportunity to practice the statistical methods they are learning in lectures, under the guidance of tutors. All Tutorials will be carried out in computer laboratories and students will be required to use the computers for implementation of the software SPSS. Examples used in Tutorials will come from a range of real research in science areas. During the Tutorial, students will carry out a large component of their individual project, which provides a major part of the assessment. Attendance at all Tutorials is expected, as it is during these times that students will complete ongoing assessment which will be acknowledged by their personal tutor. Each week personal tutors will review the work completed towards the project. Each week students will receive material which should be filed and retained for later work during the semester.

#### **Preparation:**

The prescribed text covers materials covered in lectures and put into practice in the Tutorials, along with corresponding instructions for the use of SPSS.

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### Content Schedule

#### *Weekly Teaching Schedule*

<b>Week</b>	<b>Topic</b>	<b>Activity</b>	<b>Readings</b>
1	Introduction to Statistics and Statistical Software	Lecture	Text: Chapter 1.1, 1.2, 1.3,
2	Probability, Exploratory Data Analysis. Discuss Project	Lecture	Text: Chapter 2.1, 2.2, 2.3, 2.4 & 3.1, 3.2, 3.3

	EDA and Using SPSS	Tutorial	
3	Sampling Distributions, Estimating a proportion	Lecture	Text: Chapter 4.1, 4.2 & 4.3
	Using SPSS for EDA	Tutorial	
4	Hypothesis Testing. Test of a Proportion	Lecture	Text: Chapters 5.2, 5.3, 6.1 & 6.3
	Hypothesis Testing & Estimating a Proportion	Tutorial	
5	Tests of Difference in Means	Lecture	Text: Chapters 5 & 6
	Testing Means	Tutorial	
6	ANOVA I	Lecture	Text: Chapter 9
	ANOVA in SPSS	Tutorial	
7	ANOVA II	Lecture	Text: Chapter 9
	ANOVA in SPSS	Tutorial	
	Quiz: ANOVA	Examination	
8	ANOVA III	Lecture	
	ANOVA III	Tutorial	
9	Regression and Correlation Part 1	Lecture	Text: Chapter 10.2
	Regression in SPSS	Tutorial	
	Quiz: Factorial ANOVA	Examination	Text: Chapter 10.2
10	Regression and Correlation II	Lecture	
	Regression	Tutorial	
	Quiz: Regression	Examination	
11	Chi Square	Lecture	
	Chi-Square	Tutorial	

12	Revision	Lecture	
	Interpreting SPSS Output	Tutorial	
14	Final Exam	Examination	

## Assessment

This section sets out the assessment requirements for this course.

### Summary of Assessment

Item	Assessment Task	Weighting	Relevant Learning Outcomes	Due Date
1	Quiz: Test of Proportion	5%	1, 2, 3, 4, 9	Week 5
2	Project 1	10%	1, 2, 3,4, 5,6,7,8,9	Week 6
3	Quiz: One Way ANOVA	5%	1,2,7,	Week 7
4	Quiz: Factorial ANOVA	5%	2, 3, 8	Week 9
5	Project 2	20%	2,5,7,8,9,10	Week 11
6	Quiz: Regression and Correlation	5%	2,3,5,7,8,9	Week 12
7	Final Examination	50%	1,2,3,4,5,6,7,8,9,10	Examination Period

### Assessment Details

#### Quiz:

These multiple quizzes aim to develop an applied understanding of the basic statistical concepts, quantitative skills and problem solving techniques. These quizzes are designed to inform students of their mastering of the course content and concepts progressively throughout the semester. Quizzes will vary and will involve students applying the techniques learned in lectures and will aid the application of techniques to their particular project dataset.

It is hoped that individual students will undertake a project that relates to their own particular degree program thus providing an opportunity to apply the statistical techniques within a relevant environment. Note that all project assessment will be on an individual student basis; there will be no group assessment.

The four quizzes will be assessed on the following criteria:

- 1.completeness of task
- 2.understanding of task
- 3.ability to apply skills to specific project
- 4.ability to explain task

### **Projects 1 and 2**

The project assessments are intended to demonstrate the development of the student's skills: e.g. generic skills such as written communication, problem solving, and quantitative and qualitative analysis.

These are individual submissions and will be assessed on the following criteria:

1. clarity of expression
2. cohesiveness of material
3. correctness of solution
4. understanding of material

### **Final Examination:**

The final exam will consist of various questions relating to the lecture material, workshop activities and skills developed during the project activities. The final exam covers all materials presented in lectures, Tutorials and assignments.

Marking criteria will consist of:

1. definition of the problem
2. process of solution
3. correctness of solution
4. interpretation of solution

### **Submission and Return of Assessment Items**

Normally you will be able to collect your assignments in class within fourteen [14] days of the due date for submission of the assignment.

### **Notification and Availability of Feedback on Assessment**

Feedback for each assessment item will be provided within 2 weeks from the due date of that assignment.

### **Retention of Originals**

You must be able to produce a copy of all work submitted if so requested. Copies should be retained until after the release of final results for the course.

## *Extensions*

To apply for an extension of time for an assignment, you must submit an Application for Extension of Assignment form to your teacher at least 24 hours before the date the assignment is due. Grounds for extensions are usually: serious illness, accident, disability, bereavement or other compassionate circumstances and must be able to be substantiated with relevant documentation [e.g. Griffith College Medical Certificate]. Please refer to the Griffith College website - Policy Library - for guidelines regarding extensions and deferred assessment.

## Assessment Feedback

Marks awarded for assessment items will also be available on the on-line grades system on the Student Website within fourteen [14] days of the due date.

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## Generic Skills

Griffith College aims to develop graduates who have an open and critical approach to learning and a capacity for lifelong learning. Through engagement in their studies, students are provided with opportunities to begin the development of these and other generic skills.

Studies in this course will give you opportunities to begin to develop the following skills:

Generic Skills	Taught	Practised	Assessed
Written Communication		Yes	Yes
Oral Communication		Yes	
Information Literacy		Yes	
Secondary Research	Yes	Yes	Yes
Critical and Innovative Thinking			
Academic Integrity	Yes	Yes	Yes
Self Directed Learning		Yes	
Team Work		Yes	
Cultural Intelligence			
English Language Proficiency			



## Additional Course Information

### **Teacher and Course Evaluations**

Students made comment that they found the structure of the lectures and workshops to be positive in supporting their learning, in particular the use of in-class exercises to assist their understanding of the methodologies. The students also commented that they would like more practice with statistical terminology. Last semester students welcomed the practical in-class exercises and tutorials that have been designed to assist them to understand both the statistical methodologies and terminology taught in this course.

Your feedback is respected and valued by your lecturers and tutors. You are encouraged to provide your thoughts on the course and teaching, both positive and critical, directly to your lecturer and tutor or by completing course and lecturer evaluations on the Griffith College portal whenever these are available.

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### Academic Integrity

Griffith College is committed to maintaining high academic standards to protect the value of its qualifications. Academic integrity means acting with the values of honesty, trust, fairness, respect and responsibility in learning, teaching and research. It is important for students, teachers, researchers and all staff to act in an honest way, be responsible for their actions, and show fairness in every part of their work. Academic integrity is important for an individual's and the College's reputation.

All staff and students of the College are responsible for academic integrity. As a student, you are expected to conduct your studies honestly, ethically and in accordance with accepted standards of academic conduct. Any form of academic conduct that is contrary to these standards is considered a breach of academic integrity and is unacceptable.

Some students deliberately breach academic integrity standards with intent to deceive. This conscious, pre-meditated form of cheating is considered to be one of the most serious forms of fraudulent academic behaviour, for which the College has zero tolerance and for which penalties, including exclusion from the College, will be applied.

However, Griffith College also recognises many students breach academic integrity standards without intent to deceive. In these cases, students may be required to undertake additional educational activities to remediate their behaviour and may also be provided appropriate advice by academic staff.

As you undertake your studies at Griffith College, your lecturers, tutors and academic advisors will provide you with guidance to understand and maintain academic integrity; however, it is also your responsibility to seek out guidance if and when you are unsure about

appropriate academic conduct.

In the case of any allegation of academic misconduct made against a student he or she may request the guidance and support of a Griffith College Student Learning Advisor or Student Counsellor.

Please ensure that you are familiar with the [Griffith College Academic Integrity Policy](#); this policy provides an overview of some of the behaviours that are considered breaches of academic integrity, as well as the penalties and processes involved when a breach is identified.

For further information please refer to the Academic Integrity Policy on the Griffith College website – Policy Library.

#### Risk Assessment Statement

There are no out of the ordinary risks associated with engaging in this course.

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