



## 1. General Course Information

### 1.1 Course Details

<b>Course Code:</b>	1014SCG
<b>Course Name:</b>	Statistics
<b>Trimester:</b>	Trimester 2, 2020
<b>Program:</b>	Diploma of Science
<b>Credit Points:</b>	10
<b>Course Coordinator:</b>	Dr. Seyed Hamid Shobeiri Nejad
<b>Document modified:</b>	25 <sup>th</sup> May 2020

### Course Description

This course aims to provide students with both an understanding of the basic concepts and practices of data analysis and inferential statistics (real data sets will be provided for the purpose of the projects) as well as the knowledge of several statistical techniques applicable to Science.

The course focuses on understanding the relevant statistical tests, the underlying distributions and assumptions associated with these tests, and the use of exploratory data analysis (EDA).

The course also aims to develop generic skills in redefining scientific problems in statistical terms, problem solving, statistical methodologies and writing statistical reports. Statistics is a 10-credit point course within the Diploma of Science.

### Assumed Knowledge

There are no prerequisites for this course. However, it is assumed that students have basic calculation skills.

## 1.2 Teaching Team

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

Name	Email
Dr. Seyed Hamid Shobeiri Nejad	seyed.nejad@staff.griffithcollege.edu.au

## 1.3 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 found on the Moodle Course Site.

## 1.4 Timetable

Your timetable is available on the Griffith College Portal at Class Timetable in Student and Services.

## 1.5 Technical Specifications

All students must have access to a computer or suitable mobile device.

## 2. Aims, Outcomes & Generic Skills

### 2.1 Course Aims

A major aim of this course is for the student to not only master effective use of statistical data analysis techniques but also to interpret and communicate the statistical outputs 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 two scientific reports. This course will provide an introduction to the use of a statistical computer package (R) for data analysis and interpretation of outcomes.

The course aims to develop generic skills in 1) written communication, 2) problem solving, 3) quantitative analysis, and 4) qualitative methodologies. These skills will be developed within the framework of the research projects (scientific reports on a selected research topic by the student). Problem solving and quantitative skills will also be further developed using multiple scientific cases, where the student will learn to carry out the solutions by hand as well as with R. These tasks are an aid in providing feedback to the student about their understanding of the fundamental concepts in the course.



### 2.2 Learning Outcomes

After successfully completing this course you should be able to:

- 1 Be familiar with the concept of data science and experimental design, identify statistical distributions, apply the chi-squared test for categorical data sets, and use the statistical software, R, at an introductory level.
- 2 Use the normal distribution as an approximation to the binomial distribution and apply the binomial test to hypothesis testing for a proportion.
- 3 Utilise the framework of statistical inference (estimation and hypothesis testing) and determine the significance between two means using t-test.
- 4 Apply the analysis of variance (ANOVA) to check whether there are significant differences between two or more groups using one-way and/or factorial ANOVA.
- 5 Use correlation and regression to analyse the possible relationship between continuous variables.



## 2.3 Generic Skills and Capabilities

For further details on the Generic Skills please refer to the Graduate Generic Skills and Capabilities policy.

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 and Capabilities		Taught	Practised	Assessed
Acquisition of discipline knowledge and skills with critical judgement		✓	✓	✓
Communication and collaboration		✓	✓	✓
Self-directed and active learning		✓	✓	
Creative and future thinking		✓	✓	✓
Social responsibility and ethical awareness		✓	✓	✓
Cultural competence and awareness in a culturally diverse environment			✓	



## 3. Learning Resources

### 3.1 Required Learning Resources

- **The R project for statistical computing**  
R is a free software environment for statistical computing accessible from <https://www.r-project.org/>
- **Scientific calculator**
- **Weekly online lecture notes, summary slides and videos that will be provided by the teaching team**

### 3.2 Recommended Learning Resources

- **Online book**  
David M. Lane, David Scott, Mikki Hebl, Rudy Guerra, Dan Osherson, and Heidi Zimmer, (2013) *Introduction to Statistics*. Accessible from <https://open.umn.edu/opentextbooks/textbooks/introduction-to-statistics>

### 3.3 College Support Services and Learning Resources

The College provides many facilities and support services to assist students in their studies. Links to information about College support resources that are available to students are included below for easy reference.

[Digital Library](#) – Databases to which Griffith College students have access to through the Griffith Library Databases.

MyStudy – there is a dedicated website for this course via MyStudy on the Griffith College Portal.

[Academic Integrity Tutorial](#) - this tutorial helps students to understand what academic integrity is and why it matters. You will be able to identify types of breaches of academic integrity, understand what skills you will need in order to maintain academic integrity, and learn about the processes of referencing styles.

Services and Support provides a range of services to support students throughout their studies including academic advice and assignment help from Student Learning Advisors, and personal and welfare support from Student Counsellors.

Jobs and Employment in the [Student Hub](#) can assist students with career direction, resume and interview preparation, job search tips, and more.

[IT Support](#) provides details of accessing support, information on s numbers and internet access and computer lab rules.

### 3.4 Other Information about your Learning

#### **Attendance**

You are expected to actively engage in all learning experiences and learning activities which underpin the learning content in this course. You are expected to engage with the learning content and learning activities outside of timetabled class times. This requires you to be an active agent of your learning. You are expected to bring all necessary learning resources to class such as the required textbook and /or Workbook. In addition, you are encouraged to BYOD (bring your own device) to class such as a laptop or tablet. This is not a requirement as computer lab facilities are available on campus, however, the use of such devices in the classroom is encouraged with appropriate and considerate use principles being a priority.

#### **Preparation and Participation in Learning**

In order to enhance your learning, you need to prepare before participating in the learning experiences. Absorb the learning content and complete the learning activities that are provided online before you attend the scheduled learning experiences. Make sure you complete the learning activities set each week, they are designed to support your learning. Active participation in your learning will enhance your success. Ask questions when something is unclear or when you want to bring some issue to your lecturer or tutor's attention; respond to questions to test your knowledge and engage in discussion to help yourself and others learn.

#### **Consultation Sessions**

Teachers offer extra time each week to assist students outside the classroom. This is known as 'consultation time.' You may seek assistance from your teacher on email or in person according to how the teacher has explained this to the class. Attendance during consultation time is optional but you are encouraged to use this extra help to improve your learning outcomes.

#### **Course Learning Materials**

Learning materials are made available to you in MyStudy on the Griffith College Portal. The learning materials are arranged in Modules. In each Module you will find the learning content, learning activities and learning experiences. Actively working your way through these course learning materials together with your lecturer or tutor will prepare you to succeed when completing the evidence of learning (assessment).

**Self-Directed Learning**

You will be expected to learn independently. This means you must organise and engage with the course learning content even when you are not specifically asked to do so by your lecturer or tutor. The weekly guide will be helpful to organise your learning. This involves revising the weekly course learning material and completing the learning activities. It also means you will need to find additional information to evidence your learning (assessment) beyond that given to you, and to construct your own response to a question or topic. All of this requires careful planning of your time. Expect to spend, on average, at least 10 hours per week including class time for each of your courses.

**Program Progression**

You are reminded that satisfactory Program Progression requires that attendance in classes is maintained at equal to or greater than 80%, and that GPA is maintained at equal to or greater than 3.5 [please see Griffith College Policy Library - Program Progression Policy - for more information].






**Teacher and Course Evaluation**

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 via Griffith College's evaluation tool whenever these are available.



## 4. Learning Content, Learning Activities and Learning Experiences

### 4.1 Modules for Learning and Weekly Learning Content, Learning Activities and Learning Experience

	Learning Content 	Learning activities 	Learning experiences 	Evidence of learning 	Learning outcome 
<b>Module 1: Introduction to data science, statistical distribution, chi-squared test and statistical software</b>					
1	Introduction to data science, probability, statistical thinking and statistical software	Online mini lessons and associated software activities	Zoom tutorial: practicing R		1
2	Statistical distributions, goodness of fit and test of independence (application of chi-squared test)	Online mini lessons and associated activities	Zoom tutorial: practicing problem solving questions and preparing for the first quiz		1
<b>Module 2: Binomial distribution and normal distribution</b>					
3	Statistical inference, probability distribution functions and test of proportion	Online mini lessons and associated activities	Zoom tutorial: practicing problem solving questions	Quiz 1 on Module 1	2
4	Binomial and its approximation to normal distribution	Online mini lessons and associated activities	Zoom tutorial: practicing problem solving questions and preparing for the first project		2
<b>Module 3: Hypothesis testing and t-test</b>					
5	Hypothesis testing and test of difference between means (t-test) – one sample t-test	Online mini lessons and associated activities	Zoom tutorial: practicing problem solving questions	Project 1 on Module 2	3
6	Independent samples t-test and paired samples t-test	Online mini lessons and associated activities	Zoom tutorial: practicing problem solving questions and preparing for the second quiz		3

<b>Module 4: Analysis of variance (ANOVA)</b>					
<b>7</b>	Analysis of variance (ANOVA), Part I	Online mini lessons and associated activities	Zoom tutorial: practicing problem solving questions	Quiz 2 on Module 3	4
<b>8</b>	Comparisons of treatment means	Online mini lessons and associated activities	Zoom tutorial: practicing problem solving questions		4
<b>9</b>	Analysis of variance (ANOVA), Part II – Factorial ANOVA	Online mini lessons and associated activities	Zoom tutorial: practicing problem solving questions and preparing for the second project (code writing)		4
<b>Module 5: Bivariate statistical analysis</b>					
<b>10</b>	Correlation technique	Online mini lessons and associated activities	Zoom tutorial: practicing problem solving questions and preparing for the second project (report writing)		5
<b>11</b>	Regression technique	Online mini lessons and associated activities	Zoom tutorial: practicing problem solving questions and preparing for the third quiz	Project 2 on Module 4	5
<b>Revision</b>					
<b>12</b>	Revision: Practice exam	Online mini revision	Zoom tutorial: practicing problem solving questions	Quiz 3 on Module 5	1,2,3,4,5



## 5. Evidence of Learning (Assessment Plan)

### 5.1 Evidence of Learning Summary

				
	Evidence of learning	Weighting	Learning outcome	Due Date
1	Quiz 1	10%	1	Week 3
2	Project 1	15%	2	Week 5
3	Quiz 2	10%	3	Week 7
4	Project 2	15%	4	Week 11
5	Quiz 3	10%	5	Week 12
6	Final Exam	40%	1, 2, 3, 4, 5	Exam Week

### 5.2 Evidence of Learning Task Detail

#### Quizzes

The online quizzes are open book and aim to develop an applied understanding of statistical analysis, quantitative skills and problem solving techniques. These quizzes are designed to inform the student of their mastering of the modules and of their progress throughout the trimester.

#### Projects 1 and 2

The projects 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.

The 'real' data will be provided by the teaching team for both projects.

Note that both projects will require students to work individually.

Project 1 (calculation & report) involves: writing a short report, approximately 300 words, including an introduction, research question, methodology, calculations and conclusion.

Project 2 (report) involves: writing an approximately 1000 word report based on the outcomes of running an ANOVA test in R on a selected topic by the student.

#### Final Examination

The final exam is open book and consists of various questions relating to the lecture material, workshop activities and skills developed from the projects. The exam includes true and false questions, multiple choice questions, short answer questions, and problem solving questions. The final exam will be 120 minutes plus a 10-minute perusal time. As part of revision, the students will be provided with a practice final exam.

#### Requirements to pass the course (mandatory pass components)

Students are required to:

- Achieve an overall aggregate mark of at least 50%.
- Achieve a mark of at least 50% in both project assessment items combined (min 15 out of 30).
- Achieve a mark of at least 50% in all quiz items combined (min 15 out of 30).
- Achieve a mark of at least 40% in the final exam (min 16 out of 40).



### 5.3 Late Submission

An evidence of learning (assessment) item submitted after the due date, without an approved extension from the Course Coordinator, will be penalised. The standard penalty is the reduction of the mark allocated to the assessment item by 5% of the maximum mark applicable for the assessment item, for each working day or part working day that the item is late. Evidence of learning items submitted more than five working days after the due date are awarded zero marks.

Please refer to the Griffith College website - Policy Library > Assessment Policy for guidelines and penalties for late submission.

### 5.4 Other Information about Evidence of Learning

#### 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.

#### Requests for extension

To apply for an extension of time for an evidence of learning item, 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 Student Medical Certificate](#)]. Please refer to the Griffith College website - Policy Library - for guidelines regarding extensions and deferred assessment.

#### Return of Evidence of Learning Items

1. Marks awarded for in-trimester evidence of learning items, except those being moderated externally with Griffith University, will be available on the Student Portal within fourteen [14] days of the due date. This does not apply to the final evidence of learning item in this course (marks for this item will be provided with the final course result).
2. Students will be advised of their final grade through the Student Portal. Students can review their final exam papers after student grades have been published. Review of final exam papers will not be permitted after the final date to enrol.
3. Marks for **all** evidence of learning items including the final exam (if applicable) will be recorded in the Moodle Course Site and made available to students through the Moodle Course Site.

*The sum of your marks of evidence of learning items in this course does not necessarily imply your final grade for the course. Standard grade cut off scores can be varied for particular courses, so you need to wait for the official release of grades to be sure of your grade for this course.*

## 6. Policies & Guidelines

Griffith College assessment-related policies can be found in the [Griffith College Policy Library](#) which include the following policies:

Assessment Policy, Special Consideration, Deferred Assessment, Alternate Exam Sitting, Medical Certificates, Academic Integrity, Finalisation of Results, Review of Marks, Moderation of Assessment, Turn-it-in Software Use. These policies can be accessed using the 'Document Search' feature within the [Policy Library](#)

**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 an allegation of a breach of academic integrity being 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 Griffith College website - Policy Library > Academic Integrity Policy

### **Reasonable Adjustments for Assessment – The Disability Services policy**

The Disability Services policy (accessed using the Document Search' feature with the [Policy Library](#)) outlines the principles and processes that guide the College in making reasonable adjustments to assessment for students with disabilities while maintaining academic robustness of its programs.

### **Risk Assessment Statement**

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

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