1. General Course Information

1.1 Course Details

Course Code:	1014SCG
Course Name:	Statistics
Trimester:	Trimester 2, 2024
Program:	Diploma of Science
Credit Points:	10
Course Coordinator:	Dr. Zarko Barjaktarovic
Document modified:	28th May 2024

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 teacher can be contacted via the email system on the portal.

Name	Email
Zarko Barjaktarovic	zarko.barjaktarovic@griffithcollege.edu.au

1.3 Meet with your teacher

Your teacher is available each week to meet outside of normal class times. This is called consultation. Times that your teacher will be available for consultation will be found on the Teacher's tile on your Course Site.

1.4 Timetable

Your timetable is available on the Griffith College Digital Campus at My Apps, Timetable.

1.5 Technical Specifications

All students must have access to a computer or suitable mobile device such as laptop or tablet (mobile phones are not suitable). In addition, up-to-date browser access, a reliable high-speed internet connection with enough upload and download capacity, a webcam and headset including microphone are needed.

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 Graduate Capabilities and Employability Skills

For further details on the Graduate Capabilities and Employability Skills please refer to the Graduate Generic Skills and Abilities Policy.

Griffith College is committed to producing graduates who are able to demonstrate progress toward the development of a number of generic skills / capabilities that will allow them to successfully continue their studies at the tertiary level. This set of skills includes employability related skills that will ensure graduates are capable in the workplace of the future.

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

Graduate Capabilities and Employability Skills			Focus within this course
Interacting with People	Teamwork		✓
	Communication		✓
	Respect for Culture and Diversity		✓
Readiness for the Workplace	Problem Solving		✓
	Planning and Organisation		✓
	Creativity and Future Thinking		✓

3. Learning Resources

3.1 Required Learning Resources

A. The R project for statistical computing

R is a free software environment for statistical computing accessible from https://www.r-project.org/

B. Scientific calculator

C. Weekly learning materials that will be provided by the teaching team

3.2 Recommended Learning Resources

D. 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

Griffith College provides many facilities and support services to assist students in their studies. Links to information aboutsupport 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 LibraryDatabases.
- Study Toolbox – there is a dedicated website for this course on the Griffith College Digital Campus.
- Academic Integrity - Griffith College is committed to ensuring academic integrity is understood and maintained byall staff and students. All students learn about academic integrity through engagement with Academic Integrity online modules within the Academic and Professional Studies course.
- Services and Support provides a range of services to support students throughout their studies including academicadvice 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 interviewpreparation, 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

3.1 Other Information about your Learning

Preparation and Participation in Learning

You need to prepare before attending your scheduled Learning Experience (In Class). Work through the Learning Content (Before Class) prepared by your teacher which is found on the course site. Make sure you complete the Learning Activities (After Class) set each week. 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 teacher's attention; respond to questions to test your knowledge and engage in discussion to help yourself and others learn.

Attendance

You are expected to actively engage in all learning experiences which underpin the learning content in this course. Attendance will be recorded by your teacher in each learning experience to ensure you are meeting the requirements of the program you are studying and/or your visa conditions. You are expected to engage with the learning content and learning activities outside of timetabled class times. You are expected to bring all necessary learning resources to class such as the required textbook and /or Workbook.

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 the course site. The learning materials are arranged in Modules. In

each Module you will find Learning Content (Before Class), Learning Experiences (In Class) and Learning Activities (After Class). **Learning Content (Before Class)** will be engaged with prior to the scheduled **Learning Experience (In Class)**. This will ensure you are prepared for the scheduled Learning Experience (In Class) by being aware of the content to be covered and therefore will be able to actively participate in the session. **Learning Activities (After Class)** are accessed after the scheduled session for purposes of review, consolidation of learning, and preparation for the Evidence of Learning Tasks (Assessments) in the course.

Self-Directed Learning

You will be expected to learn independently. This means you must organise and engage with the course Learning Content (Before Class) even when you are not specifically asked to do so by your teacher. The weekly guide (below) will be helpful to organise your learning. This involves revising the weekly course Learning Content (Before Class) and completing the Learning A ctivities (After Class). It also means you will need to find additional information to evidence your learning 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%, students are engaged in their learning 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].

International students enrolled in Language Development Modules (LDM100 / LDM200 or LDH100 / LDH200)

Successful completion of LDM100 and LDM200 or LDH100 and LDH200 is **required** to graduate with your Diploma award and progress to your Bachelor. If you do not achieve non-graded passes for these language modules your progression to your Bachelor will be affected. Please attend all your classes and submit your assessment.

Teacher and Course Evaluation

Your feedback is respected and valued by your teachers. You are encouraged to provide your thoughts on the course and teaching, both positive and critical, directly to your teacher or by completing course and teacher evaluations via Griffith College's evaluation tool whenever these are available.

4. Weekly Guide: Learning Content, Learning Experiences and Learning Activities

The information below lays out how your learning will be organised throughout the trimester:

Week	Learning Content (Before Class)	Learning Experiences (In Class)	Learning Activities (After Class)	Evidence of Learning (Assessment)	Learning Outcome
					
	Module 1: Introduction to data science, statistical distribution, chi-squared test and statistical software				
1	Introduction to data science, probability, statistical thinking and statistical software	Online mini lessons and associated software activities	Zoom sessions: 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 sessions: practicing problem solving questions and preparing for the first quiz		1
	Module 2: Binomial distribution and normal distribution				
3	Statistical inference, probability distribution functions and test of proportion	Online mini lessons and associated activities	Zoom sessions: 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 sessions: practicing problem solving questions and preparing for the first project		2
	Module 3: Hypothesis testing and t-test				
5	Hypothesis testing and test of difference between means (t-test) – one sample t-test	Online mini lessons and associated activities	Zoom sessions: 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 sessions: practicing problem solving questions and preparing for the second quiz		3
	Module 4: Analysis of variance (ANOVA)				
7	Analysis of variance (ANOVA), Part I	Online mini lessons and associated activities	Zoom sessions: practicing problem solving questions	Quiz 2 on Module 3	4
8	Comparisons of treatment means	Online mini lessons and associated activities	Zoom sessions: practicing problem solving questions		4
9	Analysis of variance (ANOVA), Part II – Factorial ANOVA	Online mini lessons and associated activities	Zoom sessions: practicing problem solving questions and preparing for the second project (code writing)		4
	Module 5: Bivariate statistical analysis				
10	Correlation technique	Online mini lessons and associated activities	Zoom sessions: practicing problem solving questions and preparing for the second project (report writing)		5
11	Regression technique	Online mini lessons and associated activities	Zoom sessions: practicing problem solving questions and preparing for the third quiz	Project 2 on Module 4	5
	Revision				

12	Revision: Practice exam	Online mini revision	Zoom sessions: practicing problem solving questions	Quiz 3 on Module 5	1,2,3,4,5

5. Evidence of Learning (Assessment)

5.1 Evidence of Learning Summary

	Evidence of Learning (Assessment)	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

You are required to **submit your own work** for marking. All planning, notes and drafts need to be retained so they can be presented to your teacher if requested.

Tools that generate course content or extensively enhance a student's English language capability are not permitted to be used. Web applications such as ChatGPT, Google Translate, Grammarly and Youdao (or equivalent services) are not permitted for outright assessment creation, translation, or extensive language assistance purposes. In addition, Wikipedia, Baidu, Weibo and WeTalk are not permitted to be used.

Students should follow all teacher directions about the use of Generative Artificial Intelligence (Gen-AI) tools in relation to formative and summative assessment tasks (including how to cite Gen-AI tools, if relevant). It should be noted that Turnitin provides teaching staff with a Gen-AI percentage indicator as well as an Originality Report which detects plagiarism.

1. **Evidence of Learning Task 1: Quiz 1 (10%)**

Task Type: Examination
Due Date: Week 3 in class
Weight: 10%, Marked out of: 10
Length: 1 hour
Task Description: problem solving
Criteria and Marking: Students are assessed on test of independence and goodness of fit
Submission: online quiz

2. **Evidence of Learning Task 2: Project 1 (15%)**

Task Type: Assignment
Due Date: week 5
Weight: 15%, Marked out of: 15
Length: 2 weeks
Task Description: scientific report
Criteria and Marking: Students are assessed on binomial distributions
Submission: Turnitin via the course site

3. **Evidence of Learning Task 3: Quiz 2 (10%)**

Task Type: Examination
Due Date: Week 7 in class
Weight: 10%, Marked out of: 10
Length: 1 hour
Task Description: problem solving

Criteria and Marking: Students are assessed on t-test
Submission: online quiz/exam

4. Evidence of Learning Task 4: Project 2 (15%)

Task Type: Assignment
Due Date: week 11
Weight: 15%, Marked out of: 15
Length: 2 weeks
Task Description: Scientific report
Criteria and Marking: Students are assessed on factorial ANOVA
Submission: Turnitin via the course site

5. Evidence of Learning Task 5: Quiz 3 (10%)

Task Type: Examination
Due Date: week 12
Weight: 10%, Marked out of: 10
Length: 1 hour
Task Description: problem solving
Criteria and Marking: Students are assessed on regression
Submission: online quiz/exam

6. Evidence of Learning Task 6: Final Exam (40%)

Task Type: Examination
Due Date: Exam period
Weight: 40%, Marked out of: 100
Length: 2 hours and 10 minutes
Task Description: problem solving
Criteria and Marking: Students are assessed on all topics except binomial distributions and factorial ANOVA
Submission: exam

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 learning content material, learning experience 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.

In order to pass this Course, students must:

A. Attend and Attempt all assessment pieces.
B. Achieve an overall aggregate mark of at least 50%.
C. Achieve a mark of at least 50% in both project assessment items combined (min 15 out of 30).
D. Achieve a mark of at least 50% in all quiz items combined (min 15 out of 30).
E. Achieve a mark of at least 40% in the final exam (min 16 out of 40).

5.3 Late Submission

An Evidence of Learning Task submitted after the due date, without an approved extension from the teacher, will be penalised. The standard penalty is the reduction of the mark allocated to the Evidence of Learning Task by 5% of the maximum mark applicable for the Evidence of Learning Task, for each calendar day that the task is late. Evidence of learning tasks submitted more than seven calendar 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 Evidence of Learning Tasks

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 Evidence of Learning Tasks-related policies can be found in the Griffith College Policy Library which include the following policies:

Assessment Policy, Special Consideration, Deferred Assessment, Alternate Exam Sittings, Medical Certificates, Academic Integrity, Finalisation of Results, Review of Marks, Moderation of Assessment, Turn-it-in Software Use. These policies can be accessed 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 staffto 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 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 remediatetheir behaviour and may also be provided appropriate advice by academic staff.

As you undertake your studies at Griffith College, your teachers 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 mayrequest 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 penaltiesand 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 Evidence of Learning Tasks –

The Disability Services Policy (accessed within the Policy Library) outlines the principles and processes that guide the College in making reasonable adjustments to Evidence of Learning Tasks for students with disabilitieswhile maintaining academic robustness of its programs.

Risk Assessment Statement

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

Note: For all Diploma level programs, Griffith College acknowledges content derived from Griffith University.