USC

Course Outline

Code: SCI202
Title: Advanced Research Methods and Statistics

School: Science & Engineering
Teaching Session: Semester 2
Year: 2020
Course Coordinator: Peter Davies Email: pdavies1@usc.edu.au
Course Moderator: David Schoeman

Please go to the USC website for up to date information on the teaching sessions and campuses where this course is usually offered.

1. What is this course about?

1.1 Description

This course builds on the foundation of SCI110 and will introduce you to more sophisticated statistical analyses. Theoretical knowledge introduced during lectures will be enhanced by detailed illustration in tutorials and hands-on application in computer workshops. In each case, the theory will be applied to real-world problems. On completion of this course, you will be confident in critically assessing the range of statistical tests that might be employed in a given situation, in identifying which test best suits the scenario, and in conducting this test using cutting-edge computer software.

1.2 Course topics

Experimental design
Testing hypotheses
Qualitative vs quantitative analyses
Designing and administering questionnaires
Correlation, multiple and logistic regression
Analysis of Variance
Non-parametric statistical tests
Using SPSS

2. What level is this course?

200 level Developing - Applying broad and/or deep knowledge and skills to new contexts. May require pre-requisites and introductory level knowledge/skills. Normally undertaken in the 2nd or 3rd year of an undergraduate program

3. What is the unit value of this course?

12 units

4. How does this course contribute to my learning?

Specific Learning Outcomes On successful completion of this course you should be able to:	**Assessment Tasks** You will be assessed on the learning outcome in task/s:	**Graduate Qualities or Professional Standards mapping** Completing these tasks successfully will contribute to you becoming:
Formulate research questions and select appropriate research designs	Task 1 Task 2 Task 3	Empowered. Ethical.
Select appropriate sampling strategies and calculate required sample sizes	Task 2	Empowered. Knowledgeable.
Perform exploratory data analysis	Task 1 Task 2 Task 3	Knowledgeable.
Use a computer program to produce publication-quality graphs and descriptive statistics	Task 1 Task2	Empowered. Knowledgeable.
Evaluate the suitability of different statistical models using a range of diagnostic tools	Task 3 Task 2	Empowered. Creative and critical thinkers.
Conduct statistical tests and write concise summaries of their results, as would be required for publication in scientific journals	Task 3	Empowered. Knowledgeable.

5. Am I eligible to enrol in this course?

Refer to the USC Glossary of terms for definitions of "pre-requisites, co-requisites and anti-requisites".

5.1 Enrolment restrictions

Nil

5.2 Pre-requisites

SCI110 or BUS101

5.3 Co-requisites

Nil

5.4 Anti-requisites

ANM203

5.5 Specific assumed prior knowledge and skills (where applicable)

Basic statistical concepts including measurement scales, basic sampling strategies, presentation of data, the Normal distribution and basic parametric tests including Z scores and t tests.

6. How am I going to be assessed?

6.1 Grading scale

Standard – High Distinction (HD), Distinction (DN), Credit (CR), Pass (PS), Fail (FL)

6.2 Details of early feedback on progress

In weeks three and four workshops will be held during the tutorials to assist you in writing the assignment proposal

6.3 Assessment tasks

Task No.	Assessment Tasks	Individual or Group	Weighting %	What is the duration / length?	When should I submit?	Where should I submit it?
1	Assignment proposal	Group	20%	500 words	Week 7	Online submission
2	Scientific report	Group	40%	2500 words	Week 12	Online submission
3	Final exam	Individual	40%	2 hours	Centrally scheduled exam period	Online exam
			100%			

Assessment Task 1: Assignment proposal

Goal:	You will design a proposal for a student survey to investigate a campus issue. You will demonstrate a knowledge of a variety of survey question formats and response types using both qualitative and quantitative measurement scales..
Product:	A 15-question community survey instrument.
Format:	Individual or group submission; online submission via blackboard in week 7
Criteria:	Marks are awarded for (i) clarity of thinking through development of appropriate survey questions (ii) demonstrated understanding of statistical language (iii) use of a diversity of survey questions to demonstrate appreciation of question format (iv) ability to work in a group

Assessment Task 2: Scientific Report

Goal:	You will write a full IMRaD format scientific report detailing the results from the student survey designed in task 1, using a range of diagnostic tools and an appropriate suite of parametric and non-parametric statistical techniques.
Product:	Scientific report in IMRaD format
Format:	Individual or group submission; online submission via blackboard in week 12
Criteria:	Marks are awarded for (i) clarity of thinking through development of appropriate survey questions (ii) demonstrated understanding of statistical language (iii) use of a diversity of presentation and analytical techniques to disseminate information. (iv) adherence to scientific protocols when presenting and reporting results (v) ability to work in a group

Assessment Task 3: Final exam

Goal:	To assess knowledge gleaned from the entire 12 Weeks of the course; the language of statistics, research design, designing and administering questionnaires, correlation, multiple and logistic regression, Analysis of Variance, Non-parametric statistical tests and using SPSS.
Product:	This task comprises the solutions to a series of problems from the material of Weeks 1 - 13.
Format:	Individual submission; Solution attempts made on the examination paper 2 hours duration; centrally scheduled exam or online exam
Criteria:	Marks are awarded for (i) clarity of thinking through development of problem solutions (ii) accuracy of outcomes through appropriate use of a calculator, tables and figures (iii) demonstrated understanding of statistical language (iv) appropriate use of SPSS

	(v) demonstrated understanding and application of hypothesis testing.

7. What are the course activities?

7.1 Directed study hours

The directed study hours listed here are a portion of the workload for this course. A 12 unit course will have total of 150 learning hours which will include directed study hours (including online if required), self-directed learning and completion of assessable tasks. Directed study hours may vary by location. Student workload is calculated at 12.5 learning hours per one unit.

This course will be delivered via technology-enabled learning and teaching. All lectures will remain in this mode for Semester 2 2020. When government guidelines allow, students that elected on-campus study via the class selection process will be advised when on campus tutorials and practical sessions will resume.

Location:	Directed study hours for location:
USC Sunshine Coast	Lectures: 26 hrs total (13 weeks x 2 hr per week) Tutorials: 12 hrs total (12 weeks x 1 hrs per week except for week 1) Computer labs: 12 hours total (12 per week x 1 hrs per week except for Week 13

7.2 Course content

Week # / Module #	What key concepts/content will I learn?
1	The language of research
2	Research design
3	Qualitative research 1
4	Qualitative research 2
5	Quantitative research - Overview
6	Simpler linear relationships
7	Multiple regression
8	Logistic regression
9	Single ANOVA
10	Multiple ANOVA
11	Non-parametric tests 1
12	Non-parametric tests 2
13	Summary and Revision

Please note that the course activities may be subject to variation.

8. What resources do I need to undertake this course?

Online students will require independent access to the SPSS software package. Please note that other course information, including specific information of recommended readings, learning activities, resources, weekly readings, etc. are available on the course Blackboard site. Please log in as soon as possible.

8.1 Prescribed text(s)

Nil

The following books will be useful at various times during the course. You are not expected to read all of these works. They occasionally offer different interpretations or approaches to issues and explain the issues with examples from various fields relevant to the degrees of students doing this course.

Author	Year	Title	Publisher
Daniel W	1999	*Biostatistics: A Foundation for Analysis in the Health Sciences*	John Wiley & Sons, Brisbane

Diekhoff G	1992	*Statistics for the Social and Behavioral Sciences: Univariate, Bivariate, Multivariate*	Wm C Brown.
Fowler, J., Grant, F. and Jarvis, J.	1997	*Practical Statistics for Field Biology*	Wiley and Sons, London.
Quinn & Keogh	2002	*Experimental Design and Data Analysis for Biologists*	Cambridge University Press.
Sproull N L	1995	*Handbook of Research Methods: A Guide for Practitioners and Students in the Social Sciences*	Scarecrow Press
Woodward M	1999	*Epidemiology: Study Design and Data Analysis*	London, Chapman & Hall/CRC
Zar	1999	*Biostatistical Analysis*	Chapman Hall
De Vaus, D. A.	2002	*Surveys in Social Research*	

8.2 Specific requirements

You need access to a calculator with statistical functionality. Examples include, but are not limited to: **CasioFX100AU Scientific Calculator**; **Casio FX82 AU PLUS-BP Scientific Calculator**; **Sharp EL531WHBLK Scientific Calculator**. You need access to **IBM SPSS Statistics** (commonly called simply SPSS). SPSS is available in most USC computer laboratories. You do not need to purchase SPSS unless you are attempting the online version of the course andyou may find completing the assessment tasks easier if you have access to SPSS on your own personal computer. Unfortunately, student editions of SPSS are no longer available, and the USC licensing arrangements do not allow SPSS to be loaded onto student computers. You may wish to explore purchasing an SPSS license from (for example) www.onthehub.com. (At the time of writing, a six-month licence for IBM SPSS Statistics Base Grad Pack version 21 is about $60.)

9. Risk management

Health and safety risks for this course have been assessed as low.

It is your responsibility as a student to review course material, search online, discuss with lecturers and peers, and understand the health and safety risks associated with your specific course of study. It is also your responsibility to familiarise yourself with the University's general health and safety principles by reviewing the online Health Safety and Wellbeing training module for students, and following the instructions of the University staff.

10. What administrative information is relevant to this course?

10.1 Assessment: Academic Integrity

Academic integrity is the ethical standard of university participation. It ensures that students graduate as a result of proving they are competent in their discipline. This is integral in maintaining the value of academic qualifications. Each industry has expectations and standards of the skills and knowledge within that discipline and these are reflected in assessment.

Academic integrity means that you do not engage in any activity that is considered to be academic fraud; including plagiarism, collusion or outsourcing any part of any assessment item to any other person. You are expected to be honest and ethical by completing all work yourself and indicating in your work which ideas and information were developed by you and which were taken from others. You cannot provide your assessment work to others. You are also expected to provide evidence of wide and critical reading, usually by using appropriate academic references.

In order to minimise incidents of academic fraud, this course may require that some of its assessment tasks, when submitted to Blackboard, are electronically checked through SafeAssign. This software allows for text comparisons to be made between your submitted assessment item and all other work that SafeAssign has access to.

10.2 Assessment: Additional requirements

Eligibility for Supplementary Assessment

Your eligibility for supplementary assessment in a course is dependent of the following conditions applying:
a) The final mark is in the percentage range 47% to 49.4%
b) The course is graded using the Standard Grading scale
c) You have not failed an assessment task in the course due to academic misconduct

10.3 Assessment: Submission penalties

Late submission of assessment tasks will be penalised at the following maximum rate:

- 5% (of the assessment task's identified value) per day for the first two days from the date identified as the due date for the assessment task.
- 10% (of the assessment task's identified value) for the third day
- 20% (of the assessment task's identified value) for the fourth day and subsequent days up to and including seven days from the date identified as the due date for the assessment task.
- A result of zero is awarded for an assessment task submitted after seven days from the date identified as the due date for the assessment task.

Weekdays and weekends are included in the calculation of days late.
To request an extension, you must contact your Course Coordinator and supply the required documentation to negotiate an outcome.

10.4 Study help

In the first instance, you should contact your tutor, then the Course Coordinator. Additional assistance is provided to all students through Academic Skills Advisers. To book an appointment or find a drop-in session go to Student Hub.

Contact Student Central for further assistance: +61 7 5430 2890 or studentcentral@usc.edu.au

10.5 Links to relevant University policy and procedures

For more information on Academic Learning & Teaching categories including:

- Assessment: Courses and Coursework Programs
- Review of Assessment and Final Grades
- Supplementary Assessment
- Administration of Central Examinations
- Deferred Examinations
- Student Academic Misconduct
- Students with a Disability

Visit the USC website:
http://www.usc.edu.au/explore/policies-and-procedures#academic-learning-and-teaching

10.6 General Enquiries

In person:

- **USC Sunshine Coast** - Student Central, Ground Floor, Building C, 90 Sippy Downs Drive, Sippy Downs
- **USC South Bank** - Student Central, Building A4 (SW1), 52 Merivale Street, South Brisbane
- **USC Gympie** - Student Central, 71 Cartwright Road, Gympie
- USC Moreton Bay - Service Centre, Building A – Ground Floor, 1 Moreton Bay Parade, Petrie**USC Fraser Coast -** Student Central, Student Central, Building A, 161 Old Maryborough Rd, Hervey Bay
- **USC Caboolture -** Student Central, Level 1 Building J, Cnr Manley and Tallon Street, Caboolture

Tel: +61 7 5430 2890

Email: studentcentral@usc.edu.au