



COURSE OUTLINE

SCI202 Advanced Research Methods and Statistics

Course Coordinator: Peter Davies (pdavies1@usc.edu.au) **School:** School of Science, Technology and Engineering

2021 | Semester 2

USC Sunshine Coast
USC Moreton Bay

ON CAMPUS

Most of your course is on campus but you may be able to do some components of this course online.

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. How will this course be delivered?

ACTIVITY	HOURS	BEGINNING WEEK	FREQUENCY
ON CAMPUS			
Tutorial/Workshop 1	1hr	Week 1	13 times
Laboratory 1	1hr	Week 1	13 times
Lecture	2hrs	Week 1	13 times

1.3. 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)

Building on and expanding the scope of introductory knowledge and skills, developing breadth or depth and applying knowledge and skills in a new context. May require pre-requisites where discipline specific introductory knowledge or skills is necessary. Normally, undertaken in the second or third full-time year of an undergraduate programs.

3. What is the unit value of this course?

12 units

4. How does this course contribute to my learning?

COURSE LEARNING OUTCOMES		GRADUATE QUALITIES
On successful completion of this course, you should be able to...		Completing these tasks successfully will contribute to you becoming...
1	Formulate research questions and select appropriate research designs	Empowered Ethical
2	Select appropriate sampling strategies and calculate required sample sizes	Knowledgeable Empowered
3	Perform exploratory data analysis	Knowledgeable
4	Use a computer program to produce publication-quality graphs and descriptive statistics	Knowledgeable Empowered
5	Evaluate the suitability of different statistical models using a range of diagnostic tools	Creative and critical thinker Empowered
6	Conduct statistical tests and write concise summaries of their results, as would be required for publication in scientific journals	Knowledgeable Empowered

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. Pre-requisites

SCI110 or BUS101

5.2. Co-requisites

Not applicable

5.3. Anti-requisites

ANM203

5.4. 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 Grading (GRD)

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

DELIVERY MODE	TASK NO.	ASSESSMENT PRODUCT	INDIVIDUAL OR GROUP	WEIGHTING %	WHAT IS THE DURATION / LENGTH?	WHEN SHOULD I SUBMIT?	WHERE SHOULD I SUBMIT IT?
All	1	Artefact - Technical and Scientific	Group	20%	500 words	Week 7	Online Assignment Submission
All	2	Report	Group	40%	2500 words	Week 12	Online Assignment Submission
All	3	Examination - Centrally Scheduled	Individual	40%	2 hours	Exam Period	Exam Venue

All - Assessment Task 1: Assignment proposal

GOAL:	You will design a proposal for a qualitative survey to investigate a campus issue. You will demonstrate this by selecting an appropriate research design, and designing and evaluating questions with preliminary data analysis techniques.		
PRODUCT:	Artefact - Technical and Scientific		
FORMAT:	Individual or group submission; online submission via blackboard in week 7		
CRITERIA:	No.	Learning Outcome assessed	
	1	clarity of thinking through development of appropriate survey questions	1 2
	2	demonstrated understanding of statistical language	2
	3	use of a diversity of survey questions to demonstrate appreciation of question format	1
	4	ability to work in a group	3

All - Assessment Task 2: Scientific report

GOAL:	You will use the results from your qualitative survey already completed and write a full scientific IMRaD format report		
PRODUCT:	Report		
FORMAT:	Individual or group submission; online submission via blackboard in week 12		
CRITERIA:	No.	Learning Outcome assessed	
	1	clarity of thinking through development of appropriate survey questions	1
	2	demonstrated understanding of statistical language	3 4 5 6
	3	use of a diversity of presentation and analytical techniques to disseminate information.	3
	4	adherence to scientific protocols when presenting and reporting results	4
	5	ability to work in a group	1
	6	160 demonstrated understanding of statistical language	2 3 4

All - 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:	Examination - Centrally Scheduled	
FORMAT:	Individual submission; Solution attempts made on the examination paper 2 hours duration; centrally scheduled exam	

CRITERIA:	No.	Learning Outcome assessed	
	1	clarity of thinking through development of problem solutions	1
	2	accuracy of outcomes through appropriate use of a calculator, tables and figures	2
	3	demonstrated understanding of statistical language	3
	4	appropriate use of SPSS	2 3
	5	demonstrated understanding and application of hypothesis testing.	4
	6	170 clarity of thinking through development of problem solutions	1
	7	180 demonstrated understanding of statistical language	5

7. Directed study hours

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.

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

Please note: 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) or course reader

Please note that you need to have regular access to the resource(s) listed below. Resources may be required or recommended.

REQUIRED?	AUTHOR	YEAR	TITLE	PUBLISHER
Recommended	Daniel, W	1999	Biostatistics: A Foundation for Analysis in the Health Sciences	John Wiley & Sons
Recommended	Diekhoff G	1992	Statistics for the Social and Behavioral Sciences: Univariate, Bivariate, Multivariate	Wm C Brown
Recommended	Fowler, J., Grant, F. and Jarvis, J.	1997	Practical Statistics for Field Biology	Wiley and Sons,
Recommended	Quinn & Keogh	2002	Experimental Design and Data Analysis for Biologists	Cambridge University Press
Recommended	Sproull NL	1995	Handbook of Research Methods: A Guide for Practitioners and Students in the Social Sciences	Scarecrow Press
Recommended	Woodward M	1999	Epidemiology: Study Design and Data Analysis	Chapman & Hall/CRC
Recommended	Zar	1999	Biostatistical Analysis	Chapman Hall
Recommended	De Vaus, D. A.	2002	Surveys in Social Research	n/a

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. However, you 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. How are risks managed in this course?

Health and safety risks for this course have been assessed as low. It is your responsibility 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 and to familiarise yourself with the University's general health and safety principles by reviewing the [online induction training 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

Your eligibility for supplementary assessment in a course is dependent of the following conditions applying:

The final mark is in the percentage range 47% to 49.4%

The course is graded using the Standard Grading scale

You have not failed an assessment task in the course due to academic misconduct

10.3. Assessment: Submission penalties

Late submission of assessment tasks may 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 to negotiate an outcome.

10.4. Study help

For help with course-specific advice, for example what information to include in your assessment, you should first contact your tutor, then your course coordinator, if needed.

If you require additional assistance, the Learning Advisers are trained professionals who are ready to help you develop a wide range of academic skills. Visit the [Learning Advisers](#) web page for more information, or contact Student Central for further assistance: +61 7 5430 2890 or studentcentral@usc.edu.au.

10.5. Wellbeing Services

Student Wellbeing provide free and confidential counselling on a wide range of personal, academic, social and psychological matters, to foster positive mental health and wellbeing for your academic success.

To book a confidential appointment go to [Student Hub](#), email studentwellbeing@usc.edu.au or call 07 5430 1226.

10.6. AccessAbility Services

Ability Advisers ensure equal access to all aspects of university life. If your studies are affected by a disability, learning disorder mental health issue, , injury or illness, or you are a primary carer for someone with a disability or who is considered frail and aged, [AccessAbility Services](#) can provide access to appropriate reasonable adjustments and practical advice about the support and facilities available to you throughout the University.

To book a confidential appointment go to [Student Hub](#), email AccessAbility@usc.edu.au or call 07 5430 2890.

10.7. 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>

10.8. General Enquiries

In person:

- **USC Sunshine Coast** - Student Central, Ground Floor, Building C, 90 Sippy Downs Drive, Sippy Downs
- **USC Moreton Bay** - Service Centre, Ground Floor, Foundation Building, Gympie Road, Petrie
- **USC SouthBank** - Student Central, Building A4 (SW1), 52 Merivale Street, South Brisbane
- **USC Gympie** - Student Central, 71 Cartwright Road, Gympie
- **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