COURSE OUTLINE

ENG304 Engineering Research Methodology

School: School of Science, Technology and Engineering

2026 | Trimester 2

UniSC Sunshine Coast
UniSC Moreton Bay

BLENDED LEARNING

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

Please go to unisc.edu.au 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

Problem solving skills are essential requirements for engineers. When complex theoretical and technical problems are solved, new knowledge is created. In this course you learn how to apply the engineering research process and methods of inquiry to solve these problems. This involves critiquing current research in your discipline and developing competence in using instruments and software to collect data. You analyse and evaluate the results and judge their quality and limitations. You also learn how to communicate findings in specific engineering formats to specialist audiences.

1.2. How will this course be delivered?

ACTIVITY	HOURS	BEGINNING WEEK	FREQUENCY
BLENDED LEARNING			
Learning materials – Asynchronous learning materials	2hrs	Week 1	12 times
Tutorial/Workshop 1 – On campus	2hrs	Week 1	12 times
Seminar – Guest speakers will be invited to present to the students in weeks 1, 6 and 12.	1hr	Week 1	3 times

1.3. Course Topics

- Literature search,
- Review and citation practices
- Problem identification, formulating research questions
- Quantitative and qualitative methods – strengths and weaknesses
- Instrumentation and data logging
- Data sampling, collection, testing
- Data analysis, interpretation and limitations
- Validity, reliability, sources of error
- Data management and presentation

2. What level is this course?

300 Level (Graduate)

Demonstrating coherence and breadth or depth of knowledge and skills. Independent application of knowledge and skills in unfamiliar contexts. Meeting professional requirements and AQF descriptors for the degree. May require pre-requisites where discipline specific introductory or developing knowledge or skills is necessary. Normally undertaken in the third or fourth full-time study 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?

COURSE LEARNING OUTCOMES	GRADUATE QUALITIES MAPPING	PROFESSIONAL STANDARD MAPPING *
On successful completion of this course, you should be able to...	Completing these tasks successfully will contribute to you becoming...	Engineers Australia Stage 1 Professional Engineer Competency Standards
1 Apply current knowledge of quantitative and qualitative methods used in engineering research.	Empowered	1.4
2 Analyse, interpret and evaluate data that relate to complex theoretical and technical engineering problems.	Creative and critical thinker	2.1
3 Communicate complex research results to specialist audiences.	Engaged	3.3, 3.4
4 Act professionally, autonomously and in teams to produce a professional product.	Ethical	3.5, 3.6

* Competencies by Professional Body

CODE	COMPETENCY
ENGINEERS AUSTRALIA STAGE 1 PROFESSIONAL ENGINEER COMPETENCY STANDARDS	
1.4	Knowledge and Skill Base: Discernment of knowledge development and research directions within the engineering discipline.
2.1	Engineering Application Ability: Application of established engineering methods to complex engineering problem solving.
3.3	Professional and Personal Attributes: Creative, innovative and pro-active demeanour.
3.4	Professional and Personal Attributes: Professional use and management of information.
3.5	Professional and Personal Attributes: Orderly management of self, and professional conduct.
3.6	Professional and Personal Attributes: Effective team membership and team leadership.

5. Am I eligible to enrol in this course?

Refer to the UniSC Glossary of terms for definitions of “pre-requisites, co-requisites and anti-requisites”.

5.1. Pre-requisites

192 units and enrolled in Program SC404, SC405, SC410, SC411, SC425

5.2. Co-requisites

Not applicable

5.3. Anti-requisites

Not applicable

5.4. Specific assumed prior knowledge and skills (where applicable)

Statistics, computer programming (e.g. MATLAB and EXCEL scripting) to analyse data

5.5. Microcredential Information

Not applicable

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

Online quizzes from week 2 will provide both the student and the lecturer/tutors with a mechanism for tracking the student's progress.

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	Quiz/zes	Individual	30%	Online quizzes related to the material presented each week	Refer to Format	Online Submission
All	2	Artefact - Technical and Scientific, and Written Piece	Individual or Group	70%	3000 to 4000 words or equivalent.	Refer to Format	Online Assignment Submission with plagiarism check

All - Assessment Task 1: Two Quizzes

GOAL:	To demonstrate and apply knowledge, analyse relationships, and solve problems in Engineering research methods.
PRODUCT:	Quiz/zes
AUTHORSHIP STATEMENT:	
FORMAT:	Weeks 5 and 11 (subject to changes) You will be asked to solve Engineering problems in an online quiz for two weeks of the trimester in Canvas based on material covered in the learning material and tutorials.
CRITERIA:	**No.** — **Learning Outcome assessed** 1 Interpretation and evaluation of quantitative methods — 1
GENERIC SKILLS:	Problem solving

All - Assessment Task 2: Engineering research

GOAL:	The purpose of this Task is to deliver key components of Engineering project such as those you will submit in ENG401 and ENG402
PRODUCT:	Artefact - Technical and Scientific, and Written Piece
AUTHORSHIP STATEMENT:	
FORMAT:	You will be introduced to Engineering research and the milestones or components of such research. These components will be submitted progressively in Weeks 3, 6, 9 and 12 (subject to change). You will work on individual or group (collaboratively) tasks to create and deliver project artefacts (including a literature review, 3MT video, etc.) of 'Engineering research'. Peer ratings will be submitted for group task, ie. SPARKPLUS will be used for this rating. Check the LMS for details of each task of 'Engineering research'.
CRITERIA:	

No.		Learning Outcome assessed
1	Oral presentation: Pitch Video	3
2	Identification of the problem to be solved	2
3	Analysis and evaluation of data	2
4	Technical report	3
5	Demonstration of a professional attitude and collaboration in a team environment (peer review)	4

GENERIC SKILLS:	Communication, Collaboration, Organisation, Information literacy

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. 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 Canvas site– Please log in as soon as possible.

8.1. Prescribed text(s) or course reader

You need regular access to the resource(s) below. Many texts are available as ebooks through the Library at no additional cost.

REQUIRED?	AUTHOR	YEAR	TITLE	EDITION	PUBLISHER
Required	Thiel, D.V	2014	Research Methods for Engineers (eBook available through the library)	n/a	Cambridge University Press, UK

8.2. Specific requirements

Safety glasses and closed in footwear

9. How are risks managed in this course?

Risk assessments have been performed for all laboratory classes and a moderate level of health and safety risk exists. Moderate risks are those associated with laboratory work such as working with chemicals and hazardous substances. You will be required to undertake laboratory induction training and it is also 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 Canvas, are electronically checked through Turnitin. This software allows for text comparisons to be made between your submitted assessment item and all other work to which Turnitin has access.

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%; and
(b) The course is graded using the Standard Grading scale

Eligibility for Supplementary Assessment 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 submissions may be penalised up to and including the following maximum percentage of the assessment task's identified value, with weekdays and weekends included in the calculation of days late:
(a) One day: deduct 5%;
(b) Two days: deduct 10%;
(c) Three days: deduct 20%;
(d) Four days: deduct 40%;
(e) Five days: deduct 60%;
(f) Six days: deduct 80%;
(g) Seven days: A result of zero is awarded for the assessment task.

The following penalties will apply for a late submission for an online examination:
Less than 15 minutes: No penalty
From 15 minutes to 30 minutes: 20% penalty
More than 30 minutes: 100% penalty

10.4. 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
- Central Examinations
- Deferred Examinations
- Student Conduct
- Students with a Disability

For more information, visit https://www.usc.edu.au/explore/policies-and-procedures#academic-learning-and-teaching

10.5. Student Charter

UniSC is committed to excellence in teaching, research and engagement in an environment that is inclusive, inspiring, safe and respectful. The Student Charter sets out what students can expect from the University, and what in turn is expected of students, to achieve these outcomes.

10.6. General Enquiries

For course-specific questions, contact your teaching staff or Course Coordinator.

For other enquiries or to access support, please contact Student Central:

- UniSC Student Central
- UniSC Adelaide Student Central