



COURSE OUTLINE

ELC202 Electrical Circuits and Systems

Course Coordinator: Sajeeb Saha (ssaha@usc.edu.au) **School:** School of Science, Technology and Engineering

2021 | Semester 1

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

Electrical circuits and systems form the basis of providing power in industrial and other applications. In this course you will learn how to design and analyse electrical circuits and systems and undertake measurement and troubleshooting. You will learn about capacitance, resistance and inductance; electric and magnetic fields; and electric circuits. Through hands-on electrical engineering projects and instruction from academic and industry experts, you will develop the essential skills and knowledge necessary for professional practice.

1.2. How will this course be delivered?

ACTIVITY	HOURS	BEGINNING WEEK	FREQUENCY
ON CAMPUS			
Lecture	2hrs	Week 1	13 times
Tutorial/Workshop	1hr	Week 1	5 times
Laboratory	2hrs	Not applicable	5 times

1.3. Course Topics

- Overview of electrical engineering
- Resistive circuits
- Inductance and capacitance
- Transients
- Steady-state analysis
- Frequency response
- Transformers
- Electrical machines

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	Select appropriate theory and design methodologies to describe, design and build simple electrical circuits.	Knowledgeable
2	Apply knowledge of electrical components and develop skills to design and build a range of electrical circuits	Empowered
3	Use basic circuit theories and mathematical principles to analyse electrical circuits and systems	Creative and critical thinker
4	Describe and interpret experimental results in appropriate engineering report format	Engaged
5	Work collaboratively in teams on electrical circuit and system design to meet specified requirements	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

ENG103 and must be enrolled in Program SC404, SC405, SC410, SC411, SC425 or AB101

5.2. Co-requisites

Not applicable

5.3. Anti-requisites

Not applicable

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

A good understanding of the content of MTH103 and MTH104

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

Performance and feedback from the workshop tasks will demonstrate the level of proficiency and understanding of the course material.

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	Portfolio	Group	30%	1000 words equivalent	Week 12	Online Assignment Submission
All	2	Artefact - Technical and Scientific, and Written Piece	Individual	30%	2000 words equivalent.	Refer to Format	Online Assignment Submission
All	3	Examination - Centrally Scheduled	Individual	40%	2 hours	Exam Period	Exam Venue

All - Assessment Task 1: Workshop Portfolio

GOAL:	These tasks will develop your ability to: design, build and operate electrical circuits and systems based on industrial requirements; analyse data obtained from the experiments; and professionally communicate your scientific conclusions in a report using appropriate engineering terminology, symbols and diagrams.	
PRODUCT:	Portfolio	
FORMAT:	The electrical circuit or system for each of the exercises will be demonstrated to the workshop facilitator. A portfolio of work will be submitted by the group. You will provide drafts of your work in Weeks 1-3 and receive formative feedback on your progress.	
CRITERIA:	No.	Learning Outcome assessed
	1	Selection of appropriate theory and design methodologies to design and explain electrical circuits
	2	Application of theories to design and build required electrical circuits / systems
	3	Demonstration of the functioning of the designed circuit and system
	4	Completeness of all components of the reports with discussion and reflection on the exercise.
	5	Demonstrated ability to work collaboratively in teams on electrical circuit and system design to meet specified requirements
	6	Engineers Australia competencies assessed in this task: 2.3 Application of systematic engineering synthesis and design processes within the technology domain
	7	Engineers Australia competencies assessed in this task: 3.2 Effective oral and written communication in professional and lay domains.
	8	Engineers Australia competencies assessed in this task: 3.6 Effective team membership and team leadership
	9	Assessment criteria are mapped to the course learning outcomes. 1 2 3 4 5

All - Assessment Task 2: Written Piece: Assignments

GOAL:	These assignments will develop your understanding of core theory and its practical application and enable you to address gaps in your understanding and/or problem-solving skills.
PRODUCT:	Artefact - Technical and Scientific, and Written Piece
FORMAT:	For this task you will produce a consolidated written response in the form of a document approximately 2000 words equivalent in total length including figures, text, and diagrams. You will submit elements of the task periodically to receive timely feedback to inform your learning and improve your work. Due Week 4, 7, 11

CRITERIA:	No.	Learning Outcome assessed
	1	Selection of appropriate theory and design methodologies to design and explain electrical circuits
	2	Correct application of theories to design and build required electrical circuits / systems
	3	Utilization of circuit theories and principles to examine circuits and systems
	4	Demonstration of the functioning of the designed circuit and system through use of correct theories and mathematical formulae
	5	Engineers Australia competencies assessed in this task: 1.3 In-depth understanding of specialist bodies of knowledge within the engineering discipline
	6	Engineers Australia competencies assessed in this task: 2.1 Application of established engineering methods to complex engineering problem solving

All - Assessment Task 3: Final Exam

GOAL:	The final exam will develop your ability to independently apply your skills and knowledge to solve familiar problem-based questions with confidence within a set time limit and without access to additional resources.																
PRODUCT:	Examination - Centrally Scheduled																
FORMAT:	Centrally scheduled 2-hour closed book examination.																
CRITERIA:	<table border="1"> <thead> <tr> <th>No.</th> <th>Learning Outcome assessed</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Selection of appropriate theory and design methodologies to design and explain electrical circuits.</td> </tr> <tr> <td>2</td> <td>Correct application of theory and knowledge to solve electronic circuit problems</td> </tr> <tr> <td>3</td> <td>Utilization of circuit theories and principles to examine circuits and systems.</td> </tr> <tr> <td>4</td> <td>Appropriate use of terminology, diagrams, theories and methodology</td> </tr> <tr> <td>5</td> <td>Engineers Australia competencies assessed in this task: 1.1 Comprehensive, theory-based understanding of the underpinning natural and physical sciences and the engineering fundamentals applicable to the engineering discipline.</td> </tr> <tr> <td>6</td> <td>Engineers Australia competencies assessed in this task: 1.5 Knowledge of contextual factors impacting the engineering discipline.</td> </tr> <tr> <td>7</td> <td>Engineers Australia competencies assessed in this task: 2.1 Application of established engineering methods to complex engineering problem solving.</td> </tr> </tbody> </table>	No.	Learning Outcome assessed	1	Selection of appropriate theory and design methodologies to design and explain electrical circuits.	2	Correct application of theory and knowledge to solve electronic circuit problems	3	Utilization of circuit theories and principles to examine circuits and systems.	4	Appropriate use of terminology, diagrams, theories and methodology	5	Engineers Australia competencies assessed in this task: 1.1 Comprehensive, theory-based understanding of the underpinning natural and physical sciences and the engineering fundamentals applicable to the engineering discipline.	6	Engineers Australia competencies assessed in this task: 1.5 Knowledge of contextual factors impacting the engineering discipline.	7	Engineers Australia competencies assessed in this task: 2.1 Application of established engineering methods to complex engineering problem solving.
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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
Required	A.R. Hambley	2018	Electrical Engineering: Principles & Applications	Pearson

8.2. Specific requirements

Fully enclosed shoes must be worn in the engineering laboratory. If you do not have the correct shoes you will not be allowed to do the practical. You must also undertake the laboratory induction before you can undertake any practical.

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

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 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