UniSC

COURSE OUTLINE

ELC204 Analogue and Digital Electrical Systems

School: School of Science, Technology and Engineering

2024 | Semester 2

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 usc.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

Engineers need to work with both analog and digital electronic systems. In this course you will further explore digital circuits and systems that were introduced in Digital Logic and Computer Programming (ELC200). The course will develop your understanding and knowledge of more advanced topics in AC and DC circuits including analogue amplifiers, rectifiers and converters. You will participate in laboratory work involving hardware experiments and simulation tools to analyse and design/develop more complex analogue electronic systems.

1.2. How will this course be delivered?

ACTIVITY	HOURS	BEGINNING WEEK	FREQUENCY
BLENDED LEARNING			
Learning materials – Asynchronous learning materials	1hr	Week 1	13 times
Tutorial/Workshop 1 – On campus tutorial	2hrs	Week 2	10 times
Laboratory 1 – On-campus laboratory	2hrs	Week 4	5 times
Seminar – On campus seminar	1hr	Week 1	Once Only

1.3. Course Topics

- Combinational and sequential logic circuits
- Adders, decoders, multiplexers
- Latches, flip-flops, timers
- Counters
- Moore and Mealy state machines
- Data processing and control
- Data conversion
- Fundamental amplifier circuit
- Advance topics in circuits

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 On successful completion of this course, you should be able to...	GRADUATE QUALITIES MAPPING Completing these tasks successfully will contribute to you becoming...	PROFESSIONAL STANDARD MAPPING * Engineers Australia Stage 1 Professional Engineer Competency Standards
1 Select appropriate analogue and digital circuit elements and components to design and build a range of electronic systems.	Knowledgeable	1.1, 2.1
2 Apply analogue and digital circuit principles to understand the operation of more complex electronic systems	Creative and critical thinker	2.2
3 Demonstrate practical skills to design and construct analogue and digital circuits and electronic systems.	Engaged	2.3
4 Communicate ideas and designs using appropriate engineering terminology, symbols and illustrations.	Empowered	3.2
5 Work collaboratively in teams to design analogue and digital systems.	Empowered	3.6

* Competencies by Professional Body

CODE	COMPETENCY
ENGINEERS AUSTRALIA STAGE 1 PROFESSIONAL ENGINEER COMPETENCY STANDARDS	
1.1	Knowledge and Skill Base: Comprehensive, theory based understanding of the underpinning natural and physical sciences and the engineering fundamentals applicable to the engineering discipline.
2.1	Engineering Application Ability: Application of established engineering methods to complex engineering problem solving.
2.2	Engineering Application Ability: Fluent application of engineering techniques, tools and resources.
2.3	Engineering Application Ability: Application of systematic engineering synthesis and design processes.
3.2	Professional and Personal Attributes: Effective oral and written communication in professional and lay domains.
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

> ELC200 and must be enrolled in Program SC404, SC405, SC410, SC411, SC425, SC305 or AB101.

5.2. Co-requisites

> Not applicable

5.3. Anti-requisites

> Not applicable

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

> 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

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%	Each task is to be documented in a report and submitted in a group.	Refer to Format	Online Submission
All	2	Artefact - Technical and Scientific, and Written Piece	Individual	30%	No more than 10 pages of calculations, text, and diagrams	Week 12	Online Submission
All	3	Examination - Centrally Scheduled	Individual	40%	2 hrs	Exam Period	Exam Venue

All - Assessment Task 1: Report-based Workshop Portfolio

GOAL:	To develop your ability to design, build and create analogue and digital circuits/systems for problem solving and document your conclusions in a portfolio of engineering reports.	
PRODUCT:	Portfolio	
FORMAT:	Portfolio of no more than 3 pages per report of calculations, text, and diagrams in weeks 5, 8, 11	
CRITERIA:	No.	Learning Outcome assessed
	1 Selection of appropriate analogue or digital elements to design electronic systems	①
	2 Demonstration of the operation and performance of analogue or digital systems;	③
	3 Communication of design specifications using appropriate engineering terminology, symbols and diagrams in appropriate report format.	④
	4 Demonstrated ability to work collaboratively in teams to design analogue and digital systems.	⑤
	5 Conceptual understanding of the mathematics, numerical analysis, statistics, and computer and information sciences which underpin analog and digital systems;	②
GENERIC SKILLS:		

All - Assessment Task 2: Assignments

GOAL:	To develop your understanding of core theory and enable you to demonstrate your knowledge and skills in developing analogue or digital electronic systems of intermediate complexity.	
PRODUCT:	Artefact - Technical and Scientific, and Written Piece	
FORMAT:	Artefact will be no more than 10 pages of calculations, text, and diagrams and follow a specified structure.	
CRITERIA:	**No.**	**Learning Outcome assessed**
	1 Selection of appropriate analogue or digital elements to design electronic systems;	1
	2 Demonstration of efficient and effective techniques and skills to develop analogue or digital systems;	3
	3 Presentation of computer code and engineering drawings using the appropriate format, symbols and projection standards;	4
	4 Communication of design specifications using appropriate engineering terminology, symbols and diagrams.	4
GENERIC SKILLS:		

All - Assessment Task 3: Final Examination

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:	**No.**	**Learning Outcome assessed**
	1 Selection of appropriate mathematical theory and analogue and digital electronic elements;	1
	2 Correct application of theory and knowledge to solve engineering problems;	2
	3 Communication of solutions using appropriate engineering terminology, symbols and diagrams	4
GENERIC SKILLS:	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

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	EDITION	PUBLISHER
Required	Thomas L. Floyd	0	Digital Fundamentals	n/a	n/a

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 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:

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. SafeUniSC

UniSC is committed to a culture of respect and providing a safe and supportive environment for all members of our community. For immediate assistance on campus contact SafeUniSC by phone: 07 5430 1168 or using the SafeZone app. For general enquires contact the SafeUniSC team by phone 07 5456 3864 or email safe@usc.edu.au.

The SafeUniSC Specialist Service is a Student Wellbeing service that provides free and confidential support to students who may have experienced or observed behaviour that could cause fear, offence or trauma. To contact the service call 07 5430 1226 or email studentwellbeing@usc.edu.au.

10.5. 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.

10.6. 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.

10.7. 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.

10.8. 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

10.9. 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.

10.10. General Enquiries

In person:

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

Tel: +61 7 5430 2890

Email: studentcentral@usc.edu.au