

# ELC200 Digital Logic and Computer Programming

**School:** School of Science, Technology and Engineering

2023 | Semester 1

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](http://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

The ability to program computers and electronic instrumentation is an important skill for engineers. This course will build on the introductory content presented in ENG103 and ENG101. It will help you to increase your specific understanding and knowledge of algorithms, data types and digital logic to develop more complex computer programming applications using the C programming language. This course will also provide you the knowledge on understanding microcontroller architectures.

### 1.2. How will this course be delivered?

ACTIVITY	HOURS	BEGINNING WEEK	FREQUENCY
<b>BLENDED LEARNING</b>			
<b>Learning materials</b> – Asynchronous Learning Material	1hr	Week 1	13 times
<b>Tutorial/Workshop 1</b> – On Campus tutorial	2hrs	Week 1	10 times
<b>Laboratory 1</b> – On campus lab	2hrs	Week 4	5 times
<b>Seminar</b> – On campus seminar	1hr	Week 1	Once Only

### 1.3. Course Topics

- Digital concepts and number systems
- Logic gates and Boolean algebra
- Logic simplification
- Basic combinational logic
- Data types
- Programming constructs
- Functions
- Arrays, strings, pointers
- Dynamic memory allocation
- Microcontroller architectures

## 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 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 Select appropriate programming elements and constructs to design and build a range of computer programs.	Knowledgeable	1.2
2 Apply fundamental digital logic theory and knowledge of mathematical principles to the operation of logic circuits.	Creative and critical thinker	1.1
3 Demonstrate practical skills and application of digital logic and computer programming for problem solving.	Engaged	2.1
4 Communicate ideas and designs using appropriate engineering terminology, symbols and illustrations.	Engaged	3.2
5 Work collaboratively in teams to design computer programs and simple digital circuits to meet specified requirements.	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.
1.2	Knowledge and Skill Base: Conceptual understanding of the mathematics, numerical analysis, statistics, and computer and information sciences which underpin the engineering discipline.
2.1	Engineering Application Ability: Application of established engineering methods to complex engineering problem solving.
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

ENG103

### 5.2. Co-requisites

Not applicable

### 5.3. Anti-requisites

Not applicable

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

A thorough knowledge and understanding of microcontrollers and programming as presented in ENG103-Introduction to Internet of Things.

## 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	Artefact - Technical and Scientific, and Written Piece	Group	40%	2000 words equivalent	Week 6	Online Submission
All	2	Portfolio	Group	30%	1500 words equivalent	Week 11	Online Submission
All	3	Examination - Centrally Scheduled	Individual	30%	2 hours	Exam Period	Exam Venue

#### All - Assessment Task 1: Technical engineering artefact

<b>GOAL:</b>	To develop your understanding of core theory and enable you to demonstrate your knowledge and skills in developing computer programs and logic circuits of intermediate complexity.						
<b>PRODUCT:</b>	Artefact - Technical and Scientific, and Written Piece						
<b>FORMAT:</b>	For this task you will produce a consolidated written artefact adhering to a specified structure that is approximately 2000 words equivalent in length including figures, text, and diagrams.						
<b>CRITERIA:</b>	<b>No.</b>						<b>Learning Outcome assessed</b>
	1	Demonstration of efficient and effective techniques and skills to develop computer programs or logic circuits					2 3
	2	Presentation of computer code and engineering drawings using the appropriate format, symbols and projection standards					4
	3	Communication of design specifications using appropriate engineering terminology and symbols					4

#### All - Assessment Task 2: Report-based Workshop Portfolio

<b>GOAL:</b>	To develop your ability to design, build and create computer programs and logic circuits for problem solving and document your conclusions in a portfolio of engineering reports.
<b>PRODUCT:</b>	Portfolio
<b>FORMAT:</b>	You'll work as a group to produce a portfolio of digital logic and computer programs and related information in the form of a document of 1500 words equivalent including figures, text, and diagrams. You will provide drafts of your work and receive formative feedback on your progress.

CRITERIA:	No.	Learning Outcome assessed	
	1	Selection of appropriate programming constructs or digital logic to design simple logic circuits or computer programs	1
	2	Application of fundamental digital logic theory and knowledge of mathematical principles to the operation of logic circuits	2
	3	Demonstration of the operation and performance of logic circuits or computer programs	3
	4	Communication of design specifications using appropriate engineering terminology, symbols and diagrams in appropriate report format	4
	5	Demonstration of ability to work collaboratively in teams to design computer programs and simple digital circuits to meet specified requirements	5

#### 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 programming constructs	2
	2	Correct application of theory and knowledge to solve engineering problems	2
	3	Communication of solutions using appropriate engineering terminology, symbols and diagrams	4

## 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	Jeri R. Hanly, Elliot B. Koffman, Mohit P. Tahiliani	2015	Problem Solving and Program Design in C, Global Edition	8th Edition	Pearson
Required	Ronald Tocci, Greg Moss, Neal Widmer	2016	Digital Systems	n/a	Prentice Hall

### 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](tel:0754301168) or using the [SafeZone](#) app. For general enquires contact the SafeUniSC team by phone [07 5456 3864](tel:0754563864) or email [safe@usc.edu.au](mailto: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](tel:0754301226) or email [studentwellbeing@usc.edu.au](mailto: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](mailto: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](mailto: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](mailto: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](mailto:studentcentral@usc.edu.au)