COURSE OUTLINE

ENG103 Introduction to the Internet of Things

School: School of Science, Technology and Engineering

2025 | Semester 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.
Online	ONLINE	You can do this course without coming onto campus, unless your program has specified a mandatory onsite requirement.

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

In this course you will start developing your micro-computing skills, which are critical for engineers to be able to logically analyze problems and implement solutions that are future focused. Computing and technology are rapidly changing and the technical professionals of the future will be expected to adapt to, and implement new technologies. Using a project-based format, you will develop your computing skills in the context of the rapidly developing Internet of Things (IoT) using micro-computers and/or controllers (eg. Raspberry Pi and/or Arduino).

1.2. How will this course be delivered?

ACTIVITY	HOURS	BEGINNING WEEK	FREQUENCY
BLENDED LEARNING			
Learning materials – Asynchronous online learning materials.	1hr	Week 1	12 times
Tutorial/Workshop 1 – On-campus workshop	2hrs	Week 1	12 times
Seminar – On campus seminar (weeks to be determined)	1hr	Week 1	2 times
ONLINE			
Learning materials – Asynchronous online learning materials	1hr	Week 1	12 times
Tutorial/Workshop 1 – Online workshop	2hrs	Week 1	12 times
Seminar – Online Seminar	1hr	Week 1	2 times

1.3. Course Topics

Internet of Things, binary numbers, microprocessors, introduction to Raspberry Pi, GPIO

Python programming, variables, arithmetic, writing Python code on Pi

Electrical & electronics, current, voltage, resistance, sensors, actuators

2. What level is this course?

100 Level (Introductory)

Engaging with discipline knowledge and skills at foundational level, broad application of knowledge and skills in familiar contexts and with support. Limited or no prerequisites. Normally, associated with the first 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 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 Confidently navigate and manipulate computing architecture	Knowledgeable Creative and critical thinker	2.2
2 Implement and connect digital and analogue sensors and programmatically interpret their signals	Creative and critical thinker Engaged	1.2
3 Create automated solutions by finding and modifying simple microcontroller programs	Knowledgeable Empowered	2.1
4 Read and interpret code and bash scripts in a range of applications	Knowledgeable Creative and critical thinker	1.2
5 Navigate a command-line driven operating system to control a computer and configure a range of applications	Knowledgeable Engaged	1.3
6 Undertake a peer review and assess other's contributions to projects	Engaged	3.2

* Competencies by Professional Body

CODE	COMPETENCY
ENGINEERS AUSTRALIA STAGE 1 PROFESSIONAL ENGINEER COMPETENCY STANDARDS	
1.2	Knowledge and Skill Base: Conceptual understanding of the mathematics, numerical analysis, statistics, and computer and information sciences which underpin the engineering discipline.
1.3	Knowledge and Skill Base: In-depth understanding of specialist bodies of knowledge within 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.
3.2	Professional and Personal Attributes: Effective oral and written communication in professional and lay domains.

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

Not applicable

5.2. Co-requisites

Not applicable

5.3. Anti-requisites

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

Year 12 level Maths

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 each of the first ten weeks of the course you are required to complete a workshop activity. Feedback from the tutor will be provided to you on your progress in each of these workshops.

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	Individual or Group	30%	Each week you will be required to complete the workshop and demonstrate you have successfully addressed each step of the exercise.	Throughout teaching period (refer to Format)	Online Submission
All	2	Quiz/zes	Individual	20%	One hour	Week 9	Online Submission
All	3	Artefact - Technical and Scientific, and Written Piece	Group	50%	Implement a project using the micro-computer and/or micro-controller with sensors.	Week 12	Online Submission

All - Assessment Task 1: Micro-computer/controller Artefacts

GOAL:	The goal of this task is to incorporate a range of binary (e.g. on or off), digital and analogue sensors using the basic architecture, operating system and memory processes of the micro-computer and/or controller.
PRODUCT:	Artefact - Technical and Scientific
FORMAT:	A working version of the product demonstrated in the workshop that is coded to record and output a range of sensors. Further details will be available on the learning management system in the assignment specification each week.
CRITERIA:	**No.** — **Learning Outcome assessed** 1 Connection of the sensors to micro-computers and microcontrollers — 1 3 2 Implementation of code and scripts to automate the operation of the sensors and collection of data, in the context of the IoT — 4
GENERIC SKILLS:	

All - Assessment Task 2: Online Quiz

GOAL:	The goal of this task is for you to demonstrate your understanding of micro-computing elements in the context of the Internet of Things and how these can be utilised for technology solutions.
PRODUCT:	Quiz/zes
FORMAT:	This one-hour quiz will consist of a set of questions to test understanding and application of concepts. This is an individual assessment.
CRITERIA:	

No.		Learning Outcome assessed
1	Understanding of basic computer architecture,	1
2	Understanding of micro-computing operating system,	3
3	Sensor use and data collection and dissemination	2
4	managing memory processes for technical applications.	2

GENERIC SKILLS:	

All - Assessment Task 3: Project

GOAL:	The goal for this task is to produce an IoT application/program that effectively solves a real-world problem.
PRODUCT:	Artefact - Technical and Scientific, and Written Piece
FORMAT:	You will be presenting a report/presentation and IoT design/development showing how you might solve a given problem using a variety of sensors and other technologies. Further details will be available on the learning management system in the assignment specification.
CRITERIA:	

No.		Learning Outcome assessed
1	Configuration of your 'product' using digital and/or analogue sensors,	2
2	Connection of the sensors to micro-computers and microcontrollers,	1 3
3	Implementation of code and scripts to automate the operation of the sensors and collection of data, in the context of the IoT,	4
4	Effectiveness of the 'product' to monitor changes and provide some response,	5
5	Peer review and contribution to the project.	6

GENERIC SKILLS:	

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	Simon Monk	2015	Programming the Raspberry Pi, Second Edition: Getting Started with Python	n/a	McGraw-Hill Education TAB

8.2. Specific requirements

A micro-computer (Raspberry Pi) or micro-controller (Arduino) and a range of sensors (depending on what you wish to build) will be required for this course. You can purchase your own or borrow from a 'technical' library.

9. How are risks managed in this course?

Risk assessments have been performed for all studio and laboratory classes and a low level of health and safety risk exists. Some risk concerns may include equipment, instruments, and tools; as well as manual handling items within the laboratory. It is your responsibility to review course material, search online, discuss with lecturers and peers and understand the 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

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. 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