

SEC604 Cryptography, Blockchain and Security

School: School of Science, Technology and Engineering

2024 | Trimester 2

UniSC Sunshine Coast

**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.

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

A cyber security specialist will use a complex array of tools, methods and applications to investigate and protect information in computer systems. This online course has been designed to introduce you to some cryptography techniques that allow different parties to securely transmit information. The course will introduce blockchain and its growing uses, including cryptocurrencies. You will learn the differences between authentication and security protocols and how private keys are exchanged to establish secure communications.

1.2. How will this course be delivered?

ACTIVITY	HOURS	BEGINNING WEEK	FREQUENCY
BLENDED LEARNING			
Learning materials – Asynchronous learning material	2hrs	Week 1	12 times
Tutorial/Workshop 1 – Synchronous on campus workshop	2hrs	Week 1	12 times
Seminar – On campus seminar	1hr	Week 1	2 times
ONLINE			
Learning materials – Asynchronous learning material	2hrs	Week 1	12 times
Tutorial/Workshop 1 – Synchronous Zoom workshop	2hrs	Week 1	12 times
Seminar – Online seminar	1hr	Week 1	2 times

1.3. Course Topics

1. Introduction to Cryptography
2. Legal, Policy and Ethics Framework of Encryption
3. Network data authentication protocols
4. Commercial Encryption Tools
5. Communications Security Principles
6. SSL/TLS and HTTPS, Certificates
7. Steganography and Secret Writing
8. Virtual Private Networks and Secure Peer to Peer Networks
9. The Onion Network and TOR
10. Introduction to Blockchain
11. Introduction to cryptocurrencies
12. Developing technologies in Cryptography

2. What level is this course?

600 Level (Specialised)

Demonstrating a specialised body of knowledge and set of skills for professional practice or further learning. Advanced application of knowledge and skills in unfamiliar contexts.

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 Identify and explain the evolution of cryptographic protocols.	Knowledgeable
2 Explain the cryptographic function of block ciphers and their value in proving the authenticity of data transactions.	Knowledgeable
3 Identify and discuss the elements of the key exchange process.	Knowledgeable
4 Apply a range of security applications suitable to secure a network connected device.	Empowered
5 Compare and contrast the value to data security and privacy of cryptographic protocols outlining their strengths and vulnerabilities.	Empowered
6 Demonstrate the qualities of professionalism, leadership and digital collaboration.	Engaged
7 Communicate research and findings to specialist and non-specialist audiences.	Engaged

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

Enrolled in SC509, SC705, SC517 or BU708

5.2. Co-requisites

Not applicable

5.3. Anti-requisites

Not applicable

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

Students will be assumed to understand technology and its role in society. They will be expected to have a working knowledge of computer systems and networks

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

Using marking rubrics, students will participate in continuous peer and self-assessment during tutorials

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	Individual	30%	2,500 words (+/- 10 percent of the stated word count)	Week 5	Online Assignment Submission with plagiarism check
All	2	Case Study	Group	30%	Group presentation (2,500 words (+/- 10 percent of the stated word count)	Week 10	Online Assignment Submission with plagiarism check
All	3	Portfolio	Group	40%	2000 words equivalent	Week 13	Online Assignment Submission with plagiarism check

All - Assessment Task 1: Network Encryption Protocol Evaluation

GOAL:	This written piece will evaluate the network encryption protocols implemented by a notional company that has been the victim of a data breach. The written piece will provide corporate leadership an assessment of their security status and make specific recommendations to their current business practices and processes.
PRODUCT:	Artefact - Technical and Scientific, and Written Piece
FORMAT:	Students will prepare a written report of no more than 2,500 words using APA7 style, and then present their concept through an oral presentation. The artefact will be written in plain English and provide suitable information that a non technical person may understand.

CRITERIA:	No.	Learning Outcome assessed
	1	Describes protocols and processes in use within a company and their effectiveness 5
	2	Correctly applies relevant encryption theories and frameworks 1
	3	Multiple perspectives are presented and arguments made on different sides and relevant position(s) 4
	4	Scholarly and authoritative reference sources using APA style referencing are used to directly support claims and arguments 7
	5	Demonstrates critical thinking, analysis and synthesis of argument 5
	6	Sentence and paragraph structures are clear and absent of grammatical and typographical errors 7

All - Assessment Task 2: Technical review of an espionage case

GOAL:	This is a cryptology challenge task where you will work with a team to decipher and work through a complex case study.	
PRODUCT:	Case Study	
FORMAT:	Group presentation	
CRITERIA:	No.	Learning Outcome assessed
	1	Identification of the elements of cryptographic and authentication protocols 2
	2	Comparison of the features of cryptographic and authentication protocols. 2
	3	Discussion - different roles both play in data security and authentication 3
	4	Professional communication of case study findings 7
	5	Demonstrate effective team work and professionalism within the team 6

All - Assessment Task 3: Proof of Work Portfolio

GOAL:	Students will complete cryptography related tasks demonstrating their understanding and knowledge of encryption and cryptographic protocols by performing periodic tasks.	
PRODUCT:	Portfolio	
FORMAT:	Students will submit task assignments demonstrating understanding of such concepts such as encryption, hashing, blockchain, and steganography.	
CRITERIA:	No.	Learning Outcome assessed
	1	Demonstrate understanding of cryptographic protocols and encryption 1
	2	Evaluation of privacy, security, reliability 1 4 5 7
	3	Professional communication 7
	4	Describe practical applications of encryption applications 2 4 5 7

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	Kahn, David	1996	The Codebreakers: The Comprehensive History of Secret Communication from Ancient Times to the Internet	n/a	Scribner; Rev Sub edition (December 5, 1996)
Recommended	David Gerard	2017	Attack of the 50 Foot Blockchain	n/a	David Gerard
Recommended	Robert Wallace,H. Keith Melton	2009	Spycraft	n/a	Penguin
Required	Daniel Drescher	2017	Blockchain Basics	n/a	Apress

8.2. Specific requirements

This is an online course therefore access to a computer with systems admin rights and unrestricted access to the internet for 10-12 hours per week is essential.

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

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.

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.

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