

**CSC306**

# Software Defined Networking

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](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 modern age is built on seamless and seemingly limit-less networks of technology. In this course you will learn how to build, evaluate and maintain the software defined networks (SDN) that make that possible. Covering topics including data and control plane abstraction, network extensibility, automation, security, and scalability, you will gain hands-on experience in SDN, network function virtualisation (NFV) and network application development. You will also develop sought after skills applied in cutting edge technologies including 5G.

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

ACTIVITY	HOURS	BEGINNING WEEK	FREQUENCY
<b>BLENDED LEARNING</b>			
<b>Lecture</b>	2hrs	Week 1	13 times
<b>Tutorial/Workshop 1</b>	2hrs	Week 1	13 times

### 1.3. Course Topics

Introduction to SDN

Why SDN?

Genesis of SDN

How SDN Works

The OpenFlow Specification

Alternative Definitions of SDN

Emerging Protocol, Controller, and Application Models

SDN in the Data Centre and other Environments

Network Functions Virtualization

Players in the SDN Ecosystem

SDN Applications

SDN Open Source

SDN Futures

## 2. What level is this course?

300 Level (Graduate)

Demonstrating coherence and breadth or depth of knowledge and skills. Independent application of knowledge and skills in unfamiliar contexts. Meeting professional requirements and AQF descriptors for the degree. May require pre-requisites where discipline specific introductory or developing knowledge or skills is necessary. Normally undertaken in the third or fourth 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	GRADUATE QUALITIES
On successful completion of this course, you should be able to...	Completing these tasks successfully will contribute to you becoming...
1 Demonstrate advanced knowledge of networking concepts and practice extended into software defined networking.	Knowledgeable
2 Select, develop and adapt programming constructs (built to coding and documentation standards) to create solutions to complex computer networking challenges.	Creative and critical thinker Empowered
3 Analyse and evaluate ethical, privacy, security and safety concerns in a software defined networking context.	Creative and critical thinker Empowered
4 Communicate software defined networks through writing reports, design documentation and specifications.	Engaged
5 Work as part of a team to produce quality computing artefacts and outcomes.	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

ICT220 and ICT221

### 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

Students will complete individual weekly workshop activities under the guidance of the workshop facilitator, providing opportunity for rapid formative feedback throughout the semester. Moreover portions 1 and 2 of Task 1 will be submitted, marked and returned with detailed feedback prior to census date.

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	Individual	20%	Less than 200 words per submission	Refer to Format	Online Submission
All	2	Case Study	Group	40%	3000 words	Week 13	Online Assignment Submission with plagiarism check
All	3	Practical / Laboratory Skills	Individual	40%	90 minutes	Exam Period	Exam Venue

All - Assessment Task 1: Networking Activity Multiplex

<b>GOAL:</b>	In networking, multiplexing is the combining of multiple analog and/or digital signals onto a single medium. In this task, you will complete a number of activities submitted over the course of the semester to form a portfolio of software defined networking artefacts. These tasks will develop your ability to design, develop, document and debug software defined networking problems and approximate tasks a networking consultant may do in industry.													
<b>PRODUCT:</b>	Portfolio													
<b>FORMAT:</b>	You will submit weekly responses to stimulus materials provided in the BB Learning Materials. Activities will include theoretical problem solving as well as programming, debugging and/or documentation to solve a series of small case study problems. Each submission will be the equivalent of less than 200 words of text, code or documentation (note some code or documentation may be supplied) Due Weeks 3, 5, 7, 9, and 11													
<b>CRITERIA:</b>	<table border="1"> <thead> <tr> <th>No.</th> <th></th> <th>Learning Outcome assessed</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Demonstration of software defined networking concepts</td> <td>1</td> </tr> <tr> <td>2</td> <td>Selection and or development of appropriate programming constructs to create or correct software defined networking applications (Course Learning outcome 2)</td> <td>2</td> </tr> <tr> <td>3</td> <td>Programming and documentation style</td> <td>2</td> </tr> </tbody> </table>	No.		Learning Outcome assessed	1	Demonstration of software defined networking concepts	1	2	Selection and or development of appropriate programming constructs to create or correct software defined networking applications (Course Learning outcome 2)	2	3	Programming and documentation style	2	
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3	Programming and documentation style	2												
<b>GENERIC SKILLS:</b>														

### All - Assessment Task 2: Connection Mastery

<b>GOAL:</b>	This task will provide a real-world experience solving a software defined networking problem for an industry case study.	
<b>PRODUCT:</b>	Case Study	
<b>FORMAT:</b>	You will submit weekly responses to stimulus materials provided in the BB Learning Materials. Activities will include theoretical problem solving as well as programming, debugging and/or documentation to solve a series of small case study problems. Each submission will be the equivalent of less than 200 words of text, code or documentation (note some code or documentation may be supplied)	
<b>CRITERIA:</b>	<b>No.</b>	<b>Learning Outcome assessed</b>
	1	Demonstration of advanced software defined networking concepts <b>1</b>
	2	Innovation, creativity and appropriateness of specification, design and solution. <b>2</b>
	3	Written communication: report, programming documentation and style <b>2 4</b>
	4	Analysis and evaluation of solutions for societal impact and ethical considerations. <b>3</b>
	5	Individual team work and performance (including Peer assessment) <b>5</b>
	6	Team organization <b>5</b>
<b>GENERIC SKILLS:</b>		

### All - Assessment Task 3: SDN Skills Demonstration

<b>GOAL:</b>	The final practical 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 just like a networking consultant working at a client's office.	
<b>PRODUCT:</b>	Practical / Laboratory Skills	
<b>FORMAT:</b>	Practical examination composed of a small set of SDN programming and documentation problems that the student must solve. Material based on tutorial activities and lecture questions.	
<b>CRITERIA:</b>	<b>No.</b>	<b>Learning Outcome assessed</b>
	1	Demonstration of advanced networking and software defined network concepts <b>1</b>
	2	Selection and or development of appropriate programming constructs to create or correct software defined networking applications <b>2</b>
	3	Programming and documentation style <b>2</b>
<b>GENERIC SKILLS:</b>		

## 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	Paul Goransson, Chuck Black, Timothy Culver	2017	Software Defined Networks: A comprehensive Approach, 2nd Ed.	n/a	Morgan Kaufmann

## 8.2. Specific requirements

Not applicable

## 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:

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)