



# ELEC828

## Software Defined Networking

S2 Day 2019

*School of Engineering*

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#### **Disclaimer**

Macquarie University has taken all reasonable measures to ensure the information in this publication is accurate and up-to-date. However, the information may change or become out-dated as a result of change in University policies, procedures or rules. The University reserves the right to make changes to any information in this publication without notice. Users of this publication are advised to check the website version of this publication [or the relevant faculty or department] before acting on any information in this publication.

## General Information

Unit convenor and teaching staff

Unit Convener

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44 Waterloo rd Room 124

Thursdays 2-3 PM

Co-Lectuerer

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44 Waterloo rD, Room 135

Thursdays 2-3 PM

Credit points

4

Prerequisites

Admission to MEng and 12cp at 600 level or above

Corequisites

Co-badged status

ELE428

Unit description

Software Defined Networking (SDN) will develop Knowledge and Skills on most advanced concepts and technologies to reduce the cost of implementation and operation as well as automation network configuration and management on big scale which will improve Network efficiency, that can be achieved by utilizing SDN concept of network control, virtualization, Network Function ventilation (NFV) and cloud computing. This unit introduces Network programmability, Virtual Machine, Virtualization, Network Function ventilation (NFV) and cloud computing the basic concepts and techniques of SDN and SDN architectures, data and control planes, SDN switches, virtualization, network operating systems, controller platforms, open flow Protocol, open stack, self-optimized networks (SON) , SDN 4G-5G mobile applications and Data centres, the unit includes practical Networking work.

## Important Academic Dates

Information about important academic dates including deadlines for withdrawing from units are

available at <https://www.mq.edu.au/study/calendar-of-dates>

## Learning Outcomes

On successful completion of this unit, you will be able to:

Describe SDN enabling technologies such as Network programmability and applications Model Network Virtualization and network function virtualization, concept and applications

Demonstrate ability to analyse SDN fundamentals, Open flow Protocol, open Stack and SDN potential.

Ability to describe to model NFV -SDN Application in Data Centres- Cloud computing architecture.

Competency to apply SDN Technology for mobile communication networks and SDN Security

## General Assessment Information

### Notifications

Formal notification of assessment tasks, grading rubrics and due dates will be posted on iLearn. Although all reasonable measures are taken to ensure the information is accurate, The University reserves the right to make changes without notice. Each student is responsible for checking iLearn for changes and updates.

### Report and Assignment Submissions

In Class Test solutions will be posted within a week after the the test date. Submissions will not be accepted once the solution is posted.

All reports and assignments must be submitted electronically through iLearn (in pdf format). Submissions will undergo plagiarism checkers using the turnitin software and any work deemed to have 20% or higher similarity score may incur academic penalty. For more details on the policies of academic penalties relating to academic honesty, please refer to the policies and procedures section below.

Submissions are expected to be typed set in a logical layout and sequence. The expected workload includes preparation of final copies and clear diagrams.

### Late submissions

Late submissions will not be accepted without prior arrangement made at least one week before the submission date. Extenuating circumstances will be considered upon lodgement of a formal notice of disruption of studies.

### Grading and passing requirement for unit

For further details about grading, please refer below in the policies and procedures section.

In order to pass this unit a student must obtain a mark of 50 or more for the unit (i.e. obtain a

passing grade P/ CR/ D/ HD).

### Student Responsibilities

Be familiar with University policy, procedures and act in accordance with those policy and procedures.

It is the responsibility of the student to retain a copy of any work submitted. Students must produce these documents upon request. Copies should be retained until the end of the grade appeal period each term.

Student is to perform the required due diligent for their assessment grade and rectify as soon as possible upon finding any errors

## Assessment Tasks

Name	Weighting	Hurdle	Due
<u>Final Exam</u>	60%	No	TBA
<u>Group based Project</u>	40%	No	W7, W13

### Final Exam

Due: **TBA**

Weighting: **60%**

Examination (Closed Book)

On successful completion you will be able to:

- Describe SDN enabling technologies such as Network programability and applications
- Model Network Virtualization and network function virtualization, concept and applications
- Demonstrate ability to analyse SDN fundamentals, Open flow Protocol, open Stack and SDN potential.
- Ability to describe to model NFV -SDN Application in Data Centres- Cloud computing architecture.
- Competency to apply SDN Technology for mobile communication networks and SDN Security

### Group based Project

Due: **W7, W13**

Weighting: **40%**

Group Based Project : SDN application, Programming Modelling , simulation emulation via Mininet or other software

SDN , Network function virtualization, open Virtual switch , Firewall ,...

Weekly 2 Hours Group project based learning

W7 progress Report 10%

W13 final Report 30%

On successful completion you will be able to:

- Describe SDN enabling technologies such as Network programability and applications
- Model Network Virtualization and network function virtualization, concept and applications
- Demonstrate ability to analyse SDN fundamentals, Open flow Protocol, open Stack and SDN potential.
- Ability to describe to model NFV -SDN Application in Data Centres- Cloud computing architecture.
- Competency to apply SDN Technology for mobile communication networks and SDN Security

## Delivery and Resources

The Unit delivery consists of interactive classes, Lectures, Brain storming sessions, PBL. It is the responsibility of the students to be active and focused regularly, attend the lectures, study the subject resources, and answer the review questions .Students will Accumulate the knowledge through strategies such as quizzes, problem-solving, short presentations, discussion or debates. Work related to SDN, NFV , open stack applications is performed by students in groups to encourage collaborative learning.

Project Identification deadline W7,W13

## Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central \(https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central\)](https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central). Students should be aware of the following policies in particular with regard to Learning and Teaching:

- [Academic Appeals Policy](#)

- [Academic Integrity Policy](#)
- [Academic Progression Policy](#)
- [Assessment Policy](#)
- [Fitness to Practice Procedure](#)
- [Grade Appeal Policy](#)
- [Complaint Management Procedure for Students and Members of the Public](#)
- [Special Consideration Policy](#) (**Note:** The Special Consideration Policy is effective from 4 December 2017 and replaces the Disruption to Studies Policy.)

Undergraduate students seeking more policy resources can visit the [Student Policy Gateway](https://students.mq.edu.au/support/study/student-policy-gateway) (<https://students.mq.edu.au/support/study/student-policy-gateway>). It is your one-stop-shop for the key policies you need to know about throughout your undergraduate student journey.

If you would like to see all the policies relevant to Learning and Teaching visit [Policy Central](http://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central) (<http://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central>).

## Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: <https://students.mq.edu.au/study/getting-started/student-conduct>

## Results

Results published on platform other than [eStudent](#), (eg. iLearn, Coursera etc.) or released directly by your Unit Convenor, are not confirmed as they are subject to final approval by the University. Once approved, final results will be sent to your student email address and will be made available in [eStudent](#). For more information visit [ask.mq.edu.au](http://ask.mq.edu.au) or if you are a Global MBA student contact [globalmba.support@mq.edu.au](mailto:globalmba.support@mq.edu.au)

## Student Support

Macquarie University provides a range of support services for students. For details, visit <http://students.mq.edu.au/support/>

## Learning Skills

Learning Skills ([mq.edu.au/learningskills](http://mq.edu.au/learningskills)) provides academic writing resources and study strategies to improve your marks and take control of your study.

- [Workshops](#)
- [StudyWise](#)
- [Academic Integrity Module for Students](#)
- [Ask a Learning Adviser](#)

## Student Services and Support

Students with a disability are encouraged to contact the [Disability Service](#) who can provide

appropriate help with any issues that arise during their studies.

## Student Enquiries

For all student enquiries, visit Student Connect at [ask.mq.edu.au](https://ask.mq.edu.au)

If you are a Global MBA student contact [globalmba.support@mq.edu.au](mailto:globalmba.support@mq.edu.au)

## IT Help

For help with University computer systems and technology, visit [http://www.mq.edu.au/about\\_us/offices\\_and\\_units/information\\_technology/help/](http://www.mq.edu.au/about_us/offices_and_units/information_technology/help/).

When using the University's IT, you must adhere to the [Acceptable Use of IT Resources Policy](#). The policy applies to all who connect to the MQ network including students.

## Graduate Capabilities

### PG - Capable of Professional and Personal Judgment and Initiative

Our postgraduates will demonstrate a high standard of discernment and common sense in their professional and personal judgment. They will have the ability to make informed choices and decisions that reflect both the nature of their professional work and their personal perspectives.

This graduate capability is supported by:

#### Learning outcomes

- Demonstrate ability to analyse SDN fundamentals, Open flow Protocol, open Stack and SDN potential.
- Ability to describe to model NFV -SDN Application in Data Centres- Cloud computing architecture.
- Competency to apply SDN Technology for mobile communication networks and SDN Security

#### Assessment task

- Group based Project

### PG - Discipline Knowledge and Skills

Our postgraduates will be able to demonstrate a significantly enhanced depth and breadth of knowledge, scholarly understanding, and specific subject content knowledge in their chosen fields.

This graduate capability is supported by:

#### Learning outcomes

- Describe SDN enabling technologies such as Network programability and applications

- Model Network Virtualization and network function virtualization, concept and applications
- Demonstrate ability to analyse SDN fundamentals, Open flow Protocol, open Stack and SDN potential.
- Ability to describe to model NFV -SDN Application in Data Centres- Cloud computing architecture.

## **Assessment tasks**

- Final Exam
- Group based Project

## **PG - Critical, Analytical and Integrative Thinking**

Our postgraduates will be capable of utilising and reflecting on prior knowledge and experience, of applying higher level critical thinking skills, and of integrating and synthesising learning and knowledge from a range of sources and environments. A characteristic of this form of thinking is the generation of new, professionally oriented knowledge through personal or group-based critique of practice and theory.

This graduate capability is supported by:

## **Learning outcomes**

- Describe SDN enabling technologies such as Network programability and applications
- Model Network Virtualization and network function virtualization, concept and applications
- Demonstrate ability to analyse SDN fundamentals, Open flow Protocol, open Stack and SDN potential.
- Ability to describe to model NFV -SDN Application in Data Centres- Cloud computing architecture.

## **Assessment tasks**

- Final Exam
- Group based Project

## **PG - Research and Problem Solving Capability**

Our postgraduates will be capable of systematic enquiry; able to use research skills to create new knowledge that can be applied to real world issues, or contribute to a field of study or practice to enhance society. They will be capable of creative questioning, problem finding and problem solving.

This graduate capability is supported by:

## Learning outcomes

- Describe SDN enabling technologies such as Network programability and applications
- Model Network Virtualization and network function virtualization, concept and applications
- Demonstrate ability to analyse SDN fundamentals, Open flow Protocol, open Stack and SDN potential.
- Ability to describe to model NFV -SDN Application in Data Centres- Cloud computing architecture.
- Competency to apply SDN Technology for mobile communication networks and SDN Security

## Assessment task

- Group based Project

## PG - Effective Communication

Our postgraduates will be able to communicate effectively and convey their views to different social, cultural, and professional audiences. They will be able to use a variety of technologically supported media to communicate with empathy using a range of written, spoken or visual formats.

This graduate capability is supported by:

## Learning outcomes

- Describe SDN enabling technologies such as Network programability and applications
- Model Network Virtualization and network function virtualization, concept and applications
- Demonstrate ability to analyse SDN fundamentals, Open flow Protocol, open Stack and SDN potential.
- Ability to describe to model NFV -SDN Application in Data Centres- Cloud computing architecture.
- Competency to apply SDN Technology for mobile communication networks and SDN Security

## Assessment tasks

- Final Exam
- Group based Project

## PG - Engaged and Responsible, Active and Ethical Citizens

Our postgraduates will be ethically aware and capable of confident transformative action in

relation to their professional responsibilities and the wider community. They will have a sense of connectedness with others and country and have a sense of mutual obligation. They will be able to appreciate the impact of their professional roles for social justice and inclusion related to national and global issues

This graduate capability is supported by:

## **Learning outcomes**

- Demonstrate ability to analyse SDN fundamentals, Open flow Protocol, open Stack and SDN potential.
- Ability to describe to model NFV -SDN Application in Data Centres- Cloud computing architecture.
- Competency to apply SDN Technology for mobile communication networks and SDN Security

## **Assessment task**

- Group based Project