School of Software and Electrical Engineering

SWINBURNE UNIVERSITY OF TECHNOLOGY

Unit Outline

TNE30009

Network Security and Resilience

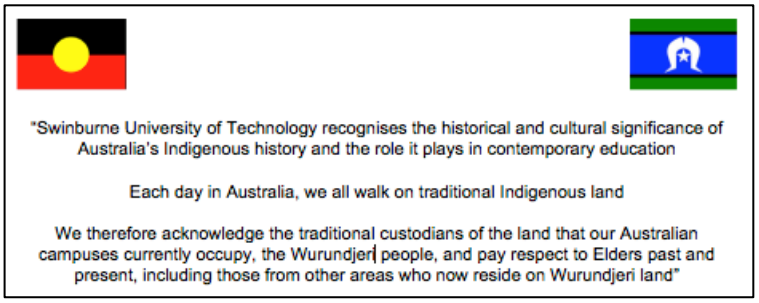
Semester 1 2023

Please read this Unit Outline carefully. It includes:

PART A Unit summary

PART B Unit in more detail

PART C Further information



PART A: Unit Summary

Unit Code(s)		TNE30009
Unit Title		Network Security and Resilience
Duration		12 weeks
Total Contact Hours		60
Requisites:		
	Pre-requisites	TNE10006 Networks and Switching OR COS20012 Communications and Security OR equivalent introduction to IP networking
	Co-requisites	
	Concurrent pre-requisites	
	Anti-requisites	
	Assumed knowledge	Basic understanding of IP networking
Credit Points		12.5
Campus/Location		Hawthorn
Mode of Delivery		On campus
Assessment Summary		Portfolio 80%, Online quizzes 20%

Aims

This unit of study aims to introduce you to the issues of security in modern networks.

Unit Learning Outcomes

Students who successfully complete this unit can:

1. Describe the threats to network security and their defences (K3)
2. Formulate an organisational security policy (S1, S2, A2)
3. Plan the implementation of a security using technologies such as firewalls, VPNs, Intrusion Detection Systems, and authentication systems (S1, S2, A2)
4. Conduct encryption of simple messages using public key and secret key techniques (K3)
5. Describe techniques used in dealing with Denial of Service Attacks (K3)
6. Describe the operation of the major security protocols (K3)
7. Describe the security issues relating to wireless technologies (K3)

Graduate Attributes

This unit may contribute to the development of the following Swinburne Graduate Attributes:

- Communication 2 - Communicating using different media Digital literacies
- Digital Literacies 2 – Technical literacy
- Digital literacies 1 – Information literacy
- Digital Literacies 2 – Technical literacy

Content

- Threats to network security

- Security policy
- Firewalls
- Encryption
- Virtual Private Networks
- Intrusion Detection Systems
- Authentication Systems
- Wireless Security

PART B: Your Unit in more detail

Unit Improvements

Because network security is a constantly changing area, this unit is updated every year. Student feedback is also considered during the update. Changes this year include:

- Portfolio assessment
- Discussion of threat environment updated to include recent attacks and attack types
- Additional material on security protocols
- Updated material on cryptography
- Changes to lab work
- Cloud Security
- Internet of Things Security

Unit Teaching Staff

Name	Role	Room	Phone	Email	Consultation Times
A/Prof Philip Branch	Unit Convenor / Lecturer/Tutor / Lab	EN606a	9214 5847	pbranch@swin.edu	By arrangement
Mr Dragoslav Mirkovic	Tutor	TBC	TBC	TBC	By arrangement

Learning and Teaching Structure

Category	Activity	Total Hours	Hours per Week	Teaching Period Weeks
Online	Lectures	36 hours	3 hours	Weeks 1 to 12
In person	Class	11 hours	1 hour	Weeks 2 to 12
In person	Lab	6 hours	12 hours	Every second week
Live Online	Consultation	12 hour	1 hours	Weeks 1 and 12

Week by Week Schedule

Week	Teaching and Learning Activity (subject to change)	Student Task or Assessment
1	Lecture: Overview, networks and TCP review	
2	Lecture and Tutorial: Threats Lab 1: Tunnelling	Lab assessed via a short quiz at end of session
3	Lecture and Tutorial: Threats	
4	Lecture and Tutorial: Security Policy, Authentication Lab 2: Firewalls	Lab assessed via a short quiz at end of session
5	Lecture and Tutorial: Firewalls	
6	Lecture and Tutorial: VPNs, Intrusion Detection and Prevention Lab 3: VPNs	Lab assessed via a short quiz at end of session and report due in week 8

7	Lecture and Tutorial: Denial of Service attacks and defences	Mid semester test
8	Lecture and Tutorial: Cryptographic algorithms Lab 4: Authentication	Lab assessed via a short quiz at end of session Lab 3 report due
9	Lecture: Cryptographic algorithms	
10	Lecture and Tutorial: Security protocols Lab 5: Cryptography	Lab assessed via a short quiz at end of session and report due in week 10
11	Lecture and Tutorial: Security protocols, Wireless Security including IoT, Cloud Security	
12	Lecture and Tutorial: Wireless Security, Revision Lab 6: Cryptography	Lab 5 report due Lab assessed via a short report due in that week End of semester test worth 10%

Assessment

a) Assessment Overview

1. Portfolio Assessment

Tasks and Details	Individual or Group	Weighting	Unit Learning Outcomes that this assessment task relates to	Assessment Due Date
Research report of up to 2500 words	Individual	HD	1,2,3,4,5,6,7	11.59 pm Sunday at end of first week of assessments (week 14)
Case study	Individual	HD	1,2,3	11.59 pm Sunday Week 12
Short laboratory quiz upon completion (6)	Individual	P	1,3,4,6	End of each lab session
Laboratory reports (2)	Individual	P	1,3,4,6	End of week two weeks after lab session

2. Additional Assessment

Tasks and Details	Individual or Group	Maximum mark	Unit Learning Outcomes that this assessment task relates to	Assessment Due Date
Mid semester test (online)	Individual	10%	1,2,3,5	Week 7
End of semester test (online)	Individual	10%	1,2,3,5	Week 12

b) Minimum requirements to pass this Unit

To pass this unit, you must:

- achieve an overall mark for the unit of 50% or more, and
- Satisfactory complete all portfolio assessment items.

Students who do not complete all portfolio items will receive a maximum of 45% as the total mark for the unit.

c) Examinations

There are no examinations for this unit.

d) Submission Requirements

Assignments and other assessments are generally submitted online through the Canvas assessment submission system which integrates with the Turnitin plagiarism checking service.

Please ensure you keep a copy of all assessments that are submitted.

In cases where a hard copy submission is required an Assessment Cover Sheet must be submitted with your assignment. The standard Assessment Cover Sheet is available from the Submitting work webpage or www.swinburne.edu.au/studentforms/

e) Extensions and Late Submission

Late Submissions - Unless an extension has been approved, late submissions will result in a penalty. You will be penalised 10% of your achieved mark for each working day the task is late, up to a maximum of 5 working days. After 5 working days, a zero result will be recorded.

f) Referencing

To avoid plagiarism, you are required to provide a reference whenever you include information from other sources in your work. Further details regarding plagiarism are available in Section C of this document under 'Academic Integrity'.

Referencing conventions required for this unit are: [Insert referencing convention]

Helpful information on referencing can be found at http://www.swinburne.edu.au/library/referencing/

g) Groupwork Guidelines

There is no groupwork in this unit

Required Textbook(s)

There are no required textbooks for this unit.

Recommended Reading Materials

The Library has a large collection of resource materials, both texts and current journals. Listed below are some references that will provide valuable supplementary information to this unit. It is also recommended that you explore other sources to broaden your understanding.
The following are good references:

- Schneier, "Applied Cryptography" Second Edition 1996
- Trappe, Washington, "Introduction to Cryptography with Coding Theory", 2006
- Anderson, "Security Engineering", 2009
- Mell, "What's Special about Cloud Security?", IEEE IT Professional, July/August 2012
- Kaufman, "Can Public-Cloud Security Meet Its Unique Challenges?", IEEE Security and Privacy, July/August 2010

- Granjal, Monteiro and Sa Silva, “Security for the Internet of Things: A Survey of Existing Protocols and Open Research Issues”, IEEE Communications Surveys and Tutorials, 17(3) 2015
- Tiburski, Amaral, deMatos, Azevedo, Hessel, “The Role of Lightweight Approaches Towards the Standardization of a Security Architecture forIoT Middleware Systems”, IEEE Communications, Dec 2016

PART C: FURTHER INFORMATION

For further information on any of these topics, refer to Swinburne's Student webpage http://www.swinburne.edu.au/student/

Student behaviour and wellbeing

All students are expected to: act with integrity, honesty and fairness; be inclusive, ethical and respectful of others; and appropriately use University resources, information, equipment and facilities. All students are expected to contribute to creating a work and study environment that is safe and free from bullying, violence, discrimination, sexual harassment, vilification and other forms of unacceptable behaviour.

The Student Charter describes what students can reasonably expect from Swinburne in order to enjoy a quality learning experience. The Charter also sets out what is expected of students with regards to your studies and the way you conduct yourself towards other people and property.

You are expected to familiarise yourself with University regulations and policies and are obliged to abide by these, including the Student Academic Misconduct Regulations, Student General Misconduct Regulations and the People, Culture and Integrity Policy. Any student found to be in breach of these may be subject to disciplinary processes.

Examples of expected behaviours are:

- conducting yourself in teaching areas in a manner that is professional and not disruptive to others
- following specific safety procedures in Swinburne laboratories, such as wearing appropriate footwear and safety equipment, not acting in a manner which is dangerous or disruptive (e.g. playing computer games), and not bringing in food or drink
- following emergency and evacuation procedures and following instructions given by staff/wardens in an emergency response

Canvas

You should regularly access the Swinburne learning management system, Canvas, which is available via the Current Students webpage or https://swinburne.instructure.com/ Canvas is updated regularly with important unit information and communications.

Communication

All communication will be via your Swinburne email address. If you access your email through a provider other than Swinburne, then it is your responsibility to ensure that your Swinburne email is redirected to your private email address.

Academic Integrity

Academic integrity is about taking responsibility for your learning and submitting work that is honestly your own. It means acknowledging the ideas, contributions and work of others; referencing your sources; contributing fairly to group work; and completing tasks, tests and exams without cheating.

Swinburne University uses the Turnitin system, which helps to identify inadequate citations, poor paraphrasing and unoriginal work in assignments that are submitted via Canvas. Your Unit Convenor will provide further details.

Plagiarising, cheating and seeking an unfair advantage with regards to an exam or assessment are all breaches of academic integrity and treated as academic misconduct.

Plagiarism is submitting or presenting someone else's work as though it is your own without full and appropriate acknowledgement of their ideas and work. Examples include:

- using the whole or part of computer program written by another person as your own

- using the whole or part of somebody else's written work in an essay or other assessable work, including material from a book, journal, newspaper article, a website or database, a set of lecture notes, current or past student's work, or any other person's work
- poorly paraphrasing somebody else's work
- using a musical composition or audio, visual, graphic and photographic work created by another
- using realia created by another person, such as objects, artefacts, costumes, models
- submitting assessments that have been developed by another person or service (paid or unpaid), often referred to as contract cheating
- presenting or submitting assignments or other work in conjunction with another person or group of people when that work should be your own independent work. This is regardless of whether or not it is with the knowledge or consent of the other person(s). Swinburne encourages students to talk to staff, fellow students and other people who may be able to contribute to a student's academic work but where an independent assignment is required, the work must be the student's own
- enabling others to plagiarise or cheat, including letting another student copy your work or by giving access to a draft or completed assignment

The penalties for academic misconduct can be severe, ranging from a zero grade for an assessment task through to expulsion from the unit and, in the extreme, exclusion from Swinburne.

Student support

Swinburne offers a range of services and resources to help you complete your studies successfully. Your Unit Convenor or studentHQ can provide information about the study support and other services available for Swinburne students.

Special consideration

If your studies have been adversely affected due to serious and unavoidable circumstances outside of your control (e.g. severe illness or unavoidable obligation), you may be able to apply for special consideration (SPC).

Applications for Special Consideration will be submitted via the SPC online tool normally no later than 5.00pm on the third working day after the submission/sitting date for the relevant assessment component.

Accessibility needs

Sometimes students with a disability, a mental health or medical condition or significant carer responsibilities require reasonable adjustments to enable full access to and participation in education. Your needs can be addressed by Swinburne's AccessAbility Services by negotiating and distributing an 'Education Access Plan'. The plan makes recommendations to University teaching and examination staff. You must notify AccessAbility Services of your disability or condition within one week after the commencement of your unit to allow the University to make reasonable adjustments.

Review of marks

An independent marker reviews all fail grades for major assessment tasks. In addition, a review of assessment is undertaken if your final result is between 45 and 49 or within 2 marks of any grade threshold.

You can ask the Unit Convenor to check the result for an assessment item or your final result. Your request must be made in writing within 10 working days of receiving the result. The Unit Convenor can discuss the marking criteria with you and check the aggregate marks of assessment components to identify if an error has been made. This is known as local resolution.

If you are dissatisfied with the outcome of the local resolution, you can lodge a formal complaint.

Feedback, complaints and suggestions

In the first instance, discuss any issues with your Unit Convenor. If your concerns are not resolved or you would prefer not to deal with your Unit Convenor, then you can complete a feedback form. See https://www.swinburne.edu.au/corporate/feedback/

Advocacy

Should you require assistance with any academic issues, University statutes, regulations, policies and procedures, you are advised to seek advice from an Independent Advocacy Officer at Swinburne Student Life.

For an appointment, please call 03 9214 5445 or email advocacy@swin.edu.au For more information, please see https://www.swinburne.edu.au/current-students/student-services-support/advocacy/