School of Software and Electrical Engineering

**Unit Outline**

**TNE20002**

**Network Routing Principles**

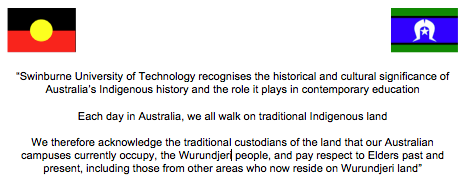
Semester 1 2022

**Please read this Unit Outline carefully. It includes:**

**PART A** Unit summary

**PART B** Your Unit in more detail

**PART C** Further information



**PART A: Unit Summary**

|  |  |  |  |
| --- | --- | --- | --- |
| Unit Code(s) | | TNE20002 | |
| Unit Title | | Network Routing Principles | |
| Duration | | 1 Semester | |
| **Total Contact Hours** | | 60 hours | |
| Requisites: | |  | |
|  | **Pre-requisites** | TNE10006 Networks and Switching | |
|  | **Co-requisites** |  | |
|  | **Concurrent pre-requisites** |  | |
|  | **Anti-requisites** |  | |
|  | **Assumed knowledge** |  | |
| Credit Points | | 12.5 | |
| **Campus/Location** | | Hawthorn | |
| **Mode of Delivery** | | Online Lecture and On Campus Practical Sessions | |
| **Assessment Summary** | | In-Semester 68**%**  Out-Semester 32% |  |

**Aims**

This Unit of study aims to provide you with a solid foundation in the technologies and functionality of routing within data networks. The Unit will also provide with an introduction to Wide Area Networks (WANs) and the skills to deploy common network services within a WAN infrastructure.

**Unit Learning Outcomes**

Students who successfully complete this unit will be able to:

1. Describe the process of routing (K3)

2. Analyse the operation of and differences between dynamic routing protocols (K3)

3. Construct a network with static and dynamic routes (K3)

4. Use Access Control Lists as a security technique to control traffic flow across the network (K2,K3,S1)

5. Describe the various WAN technology options for district-sized networks, identify and use WAN related router commands (K2,K3)

6. Describe and implement various layer 2 protocols on WAN links and configure and describe the functionality of NAT and DHCP network services (K3)

7. Within a team, design and construct a simulated network with components of LAN and WAN technologies and prepare a technical report and presentation (K2,K3,S1,S2,S3,A2,A7)

## Graduate Attributes

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

:**K2** **Maths and IT as Tools:** Proficiently uses relevant mathematics and computer and information science concepts as tools

**K3** **Discipline Specific:** Proficiently applies advanced technical knowledge of the specific discipline within that context

**S1** **Engineering Methods:** Applies engineering methods in practical applications and complex engineering problems.

**S2** **Problem Solving:** Systematically uses engineering methods in solving complex problems

**S3** **Design:** Systematically uses engineering methods in designing solutions to complex engineering problems.

**A2** **Communication:** Demonstrates effective communication to professional and wider audiences including in complex engineering activities

**A7 Teamwork:** Demonstrates effective team membership and team leadership

## Content

* Routing fundamentals
* Static and dynamic routing
* Configuring routers and routing devices
* Routing protocols (RIP, RIPv2, EIGRP, OSPF)
* WAN technologies
* Access Control Lists
* PPP
* DHCP and NAT Services
* Network Troubleshooting

# PART B: Your Unit in more detail

## Unit Improvements

* Integration of CCNA V7.0 Course Materiel

## Unit Teaching Staff

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Name** | **Role** | **Room** | **Phone** | **Email** | **Consultation Times** |
| Dragi Klimovski | Unit Convenor |  |  | dklimovski@swin.edu.au | By Appointment |
| Peter Granville | Lecturer |  |  | pgranville@swin.edu.au |  |
| Staff List on Canvas | Session Tutors |  |  | Contact via email |  |

## Learning and Teaching Structure

|  |  |  |  |
| --- | --- | --- | --- |
| **Activity** | **Total Hours** | **Hours per Week** | **Teaching Period Weeks** |
| Lectures | 12 hours | 1 hour | Weeks 1 to 12 |
| Laboratory Work | 36 hours | 3 hours | Weeks 1 to 12 |

## Week by Week Schedule

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Week** | **Week Beginning**  **Date** | **Lecture Online** | **Labs Sessions start**  **in Week 1** |  |
| **1** | **Feb 28** | Intro to Routing | ***CCNA:***  a) Enrolment  b) CCNA All Module Group  Exams Activated  Discuss Unit Outlne  Discuss Scenarios  Discuss Case Study  Scenario 1 released Fri 25/2/22 |  |
| **2** | **Mar 7** | RIP Routing Protocol | *Form ESP Case Study Teams* |  |
| **3** | **Mar 14** | Access Control Lists | Friday, Scenario 2 released |  |
| **4** | **Mar 21** | EIGRP |  |  |
| **5** | **Mar 28** | OSPF | Friday, Scenario 3 released |  |
| **6** | **Apr 4** | OSPF | **Skills Test A (On Campus)** |  |
| **7A** | **Apr**  **11 to 13** |  |  |  |
| **Mid Sem**  **Break** | **Apr**  **14 to 20** | No Classes | **No Classes**  Friday, Scenario 4 released |  |
| **7B** | **Apr**  **21 to 22** | DHCP | Friday, Scenario 5 released |  |
| **8** | **Apr 26** | NAT | **Monday Apr 25 is a holiday** |  |
| **9** | **May 2** | WAN Technologies  PPP | Friday, Scenario 6 released  **CCNA Final Test A**  **(On Campus)** |  |
| **10** | **May 9** | Multi-Area OSPF | **CCNA Final Test B**  **(On Campus)** |  |
| **11** | **May 16** | IPv6 | **Trouble Shooting Test**  **(On Campus)** |  |
| **12** | **May 23** | Review |  |  |
| **Swat Vac** | **May 30** |  |  |  |
| **Skills Test B** | **June 5** |  | **Skills Test B held this week**  **(On Campus)** |  |

## Practical Labs

## Scenarios

The aim is to allow you to integrate the different topics (theory and practical) covered in the Unit, into the building of the network platform.

Each scenario requires you to build a working network, and then add new network services and functionality to the network platform.

It is designed to be self-re-enforcing, as what you have learnt in previous scenarios is required in future scenarios.

It emphasizes an Analytical and Systematic approach to building the network platform:

* Produce a Network Topology Diagram
* Prepare the VLSM Design
* Follow a step-by-step process to ensure that, configuration, testing, and troubleshooting is done in an order and sequence that will achieve a working network.
* Doing the scenarios will prepare you for the Skills Tests.

## 

## Assessments

1. **Assessment Overview**

|  |  |  |  |
| --- | --- | --- | --- |
| **Assessments** | **Weighting** | **Unit Learning Outcomes that this assessment task relates to** | **Assessment Due Date** |
|  |  |  |  |
| 1. Skills Test A | 15% | 1 to 5 | Week 6 |
| 2.Case Study Written Report | 15% | 1 to 7 | Refer Case Study doc |
| 3.Case Study Network Simulation | 15% | 1 to 7 |
| 4. Case Study Reflection Report | 3% | 1 to 7 |
| 5.Cisco CCNA Final Test A | 2.5% | 1 to 7 | Week 9 |
| 6.Cisco CCNA Final Test B | 2.5% | 1 to 7 | Week 10 |
| 7.Trouble Shooting Test | 15% | 1 to 7 | Week 11 |
| 8. Skills Test B | 32% | 1 to 7 | Week  Beginning  Mon 6/6/22 |

**CISCO CCNA Programme:**

* You will be enrolled in the required Cisco CCNA units
* **Cisco CCNA Final Tests**
  + These Tests are CLOSED Book.
  + You must have attempted all CCNA Module Group Tests and achieve a minimum of 40 % in each Test, to be allowed to take the CCNA Final Tests
  + You are NOT allowed to bring ANY unauthorised material into the Test room. During the Test you are ONLY allowed to have 1 Web Browser window and no calculator window open. In addition you must have your windows task bar visible at ALL times.
  + You must obtain a mark of 60% or higher to pass the Cisco CCNA Unit.
  + If you fail the first attempt at a CCNA Final Test, you are permitted second attempt to pass Cisco CCNA Unit
  + Only your first attempt result is recorded as your Swinburne Result

**Case Study:**

* The Case Study consists of a:
  + Written Report
  + Network Simulation
  + Reflection Report
* Your Case Study Team must be created by the Week 2 session.
* A team can have up 4 members.
* You must create your team on ESP, <https://esp.swin.edu.au>
* Refer Submission **Requirements** .below

**Skills Tests:**

* **Lab Journal**
  + In the journal, you should record helpful summary information regarding lab exercises and scenarios – commands, troubleshooting, configuration details etc
  + Refer to your Tutor for advice regarding maintaining your journal
  + **It can be used for Reference during a skills test**
* Skills Test A
  + Held during week 6
* Trouble Shooting Skills Test
  + Held during week 11
* Skills Test B.
  + Held in week beginning Mon 6/6/22

1. **Minimum requirements to pass this Unit**

To pass this unit, you must:

* achieve an overall mark of 50% or more

1. **Submission Requirements**.

The Case Study Report and Network Simulation must be submitted through the ESP submission system (**https://esp.ict.swin.edu.au**).

Only one group member need submit the assignment for the group.

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

1. **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.

1. **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.

Referencing conventions required for this unit are the IEEE Citation Policy, more information at: <http://www.ieee.org/documents/ieeecitationref.pdf>

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

1. **Groupwork Guidelines**

A group assignment is the collective responsibility of the entire group, and if one member is temporarily unable to contribute, the group should be able to reallocate responsibilities to keep to schedule. In the event of longer-term illness or other serious problems involving a member of group, it is the responsibility of the other members to immediately notify the Unit Convenor or relevant tutor.

Group submissions must be submitted with an Assignment Cover Sheet, signed by all members of the group.

All group members must be satisfied that the work has been correctly submitted. Any penalties for late submission will generally apply to all group members, not just the person who submitted.

## Required Textbook(s)

None required

## 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.

**1. Cisco Academy Companion Guides, Cisco Press**:

* Introduction to Networks Companion Guide 2014
* Routing Protocols Companion Guide 2014
* Switched Networks Companion Guide 2014
* Routing and Switching Essentials Companion Guide 2014
* Connecting Networks Companion Guide 2014
* Scaling Networks Companion Guide 2014
* **CCNA Routing and Switching, Portable Command Guide 5th Ed 2019**

**2. Older Guides:**

* LAN Switching and Wireless, CCNA Exploration Labs and Study Guide, Alan Johnson, Cisco Press 2008
* Accessing the WAN, CCNA Exploration Labs and Study Guide, John Rullan, Cisco Press 2008
* LAN Switching and Wireless, CCNA Exploration Companion Guide, Wayne Lewis, Cisco Press 2008
* Accessing the WAN, CCNA Exploration Companion Guide, Bob Vachon, Rick Graziani, Cisco Press 2008
* CCNA Portable Commands Guide (CCNA Self-Study) 2nd Ed, Scott Empson, Cisco Press 2008

**3. Online Databases**

[https://www.swinburne.edu.my/library/databases/databases-a.php](about:blank)

**4. eBooks**

[https://www.swinburne.edu.my/library/databases/ebooks.php](about:blank)

**5. Online Magazines**

[https://www.swinburne.edu.my/library/search/magazines.php](about:blank)

# PART C: FURTHER INFORMATION



For further information on any of the below topics, refer to Swinburne’s Current Students web page <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](https://www.swinburne.edu.au/about/leadership-governance/policies-regulations/policies/people-culture-integrity/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](https://www.swinburne.edu.au/about/leadership-governance/policies-regulations/statutes-regulations/student-academic-misconduct/), [Student General Misconduct Regulations](https://www.swinburne.edu.au/about/leadership-governance/policies-regulations/statutes-regulations/student-general-misconduct/) and the [People, Culture and Integrity Policy](https://www.swinburne.edu.au/about/leadership-governance/policies-regulations/policies/people-culture-integrity/student-charter/). 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 student HQ 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 a marginal fail (45-49) or within 2 marks of a grade threshold.

If you are not satisfied with the result of an assessment you can ask the Unit Convenor to review the result. Your request must be made in writing within 10 working days of receiving the result. The Unit Convenor will review your result to determine if your result is appropriate.

If you are dissatisfied with the outcomes of the review you can lodge a formal complaint.

## Feedback, complaints and suggestions

In the first instance, discuss any issues with your Unit Convenor. If you are dissatisfied with the outcome of the discussion or would prefer not to deal with your Unit Convenor, then you can complete a feedback form. See [https://www.swinburne.edu.au/corporate/feedback/](about:blank)

## 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](about:blank) For more information, please see [https://www.swinburne.edu.au/current-students/student-services-support/advocacy/](about:blank)