UNIVERSITY OF CANBERRA

Introduction to Network Engineering

Unit code and version	11485.1
Unit offering option	205837
Study level	Level 1 - Undergraduate Introductory Unit
Credit points	3
Faculty	Faculty of Science and Technology
Discipline	Academic Program Area - Technology
Unit offering details	Semester 1, 2022 , ON-CAMPUS , UC - Canberra, Bruce
Unit convener name and contact details	Unit Convenor: A/Prof. Kumudu Munasinghe, 6C26, ph:(02) 6201 2926, email: kumudu.munasinghe@canberra.edu.au Unit Moderator: Dr. Ibrahim Elgendi(ibrahim.elgendi@canberra.edu.au)
Administrative contact details	Student Central, Building 1, Level B E: Student.Centre@canberra.edu.au T: 1300 301 727

Academic content

Unit description

This unit will focus on the following items: - introduction to data communication and networks; - introduction to modern networking environments including Australia's National Broadband Network; - introduction to the fundamental building blocks of modern network including logical and physical topologies, networking technologies and principles software and hardware environments for modern network; - Networking technologies (including Dial-up, DSL, Cable, FTTH, Ethernet, WiFi, WiMax, ATM); - Networking standards; - Networking Core (Circuit switching, Packet Switching, ISP, and Delay Loss and Throughput); - ISO-OSI and Networking Protocols (TCP/IP, UDP, Layers and Service Models); - Networking Security; - Networking Management.

Learning outcomes

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

1. Demonstrate an understanding of the discipline of network engineering, its importance and relevance to digital communication and communities of practice;
2. Describe the building blocks that form a modern network;
3. Demonstrate an understanding of the practical and theoretical background to support studying later units in the area; and
4. Demonstrate an understanding of the basic issues in network management and how to set up and manage simple data networks.

Graduate attributes

1. UC graduates are professional
    - communicate effectively
    - employ up-to-date and relevant knowledge and skills
    - use creativity, critical thinking, analysis and research skills to solve theoretical and real-world problems
    - work collaboratively as part of a team, negotiate, and resolve conflict
2. UC graduates are global citizens
    - make creative use of technology in their learning and professional lives
3. UC graduates are lifelong learners
    - adapt to complexity, ambiguity and change by being flexible and keen to engage with new ideas
    - evaluate and adopt new technology
    - reflect on their own practice, updating and adapting their knowledge and skills for continual professional and academic development

Skills development

As students of the University of Canberra, you will develop your critical thinking skills, your ability to solve complex problems, your ability to work with others, your confidence to learn independently, your written communication skills, your spoken communication skills and a number of work-related knowledge and skills.

Prerequisites

None.

Corequisites

None.

Accreditation

ACS Accreditation

This unit is part of courses accredited by the Australian Computer Society (ACS)

Skills Framework for the Information Age (SFIA) v8

This unit aligns with the following SFIA professional skills:

- Network Support NTAS
- Network Design NTDS

SFIA skills are defined by levels of responsibility, based on autonomy, influence, complexity, business skills, and knowledge. Although this unit may cover knowledge and skills at higher levels, it is expected that graduates of undergraduate degrees will be capable of operating at Level 2 overall.

Seoul Accord

The UC generic attributes address graduate attributes 1, 6, 7, 9, and 10 of the Seoul Accord. The remaining graduate attributes that are covered in this unit are:

2. Knowledge for Solving Computing Problems

3. Problem Analysis

4. Design/Development of Solutions

5. Modern Tool Usage

EA Accreditation

This unit is part of courses accredited by Engineers Australia (EA)

This unit assesses and exposes students to the following Professional Engineer Stage 1 Competencies:

1.1 Comprehensive, theory based understanding – Indicators Assessed: a

1.2 Conceptual understanding – Indicators Assessed: a

1.3 In-depth understanding – Indicators Assessed: a

1.4 Discernment – Indicators Exposed: a, b

1.5 Knowledge – Indicators Assessed: a, b, c; Exposed: d, e, f

1.6 Understanding – Indicators Assessed: a, d; Exposed b, c, e

2.1 Application of established engineering methods – Indicators Assessed: a, d, f, g, h, i; Exposed b, c, e

2.3 Application of systematic engineering synthesis and design processes – Indicators Assessed: a, d; Exposed b, c

3.2 Effective oral and written communication in professional and lay domains – Indicators Assessed: a, b

3.3 Creative, innovative and pro-active demeanour – Indicators Assessed: a; Exposed b, c

3.6 Effective team membership and team leadership – Indicators Assessed: a, d, f; Exposed b, c, e

Timetable of activities

Week	Topic	Required Reading	Assessment	
1	Introduction	Ch 1, 4, 5		

2	Physical Layer	Ch 2	Tutorial 1	
3	Data Link Layer	Ch 3, 6	Lab 1	
4	MAC Protocols and LAN Standards	Ch 3, 4	Tutorial 2	
5	Network Layer 1	Ch 7	Lab 2	
6	Network Layer 2	Ch 8	Tutorial 3	
7	Transport Layer	Ch 9	Lab 3 and Project Start	
8	Class Free	Class Free	Class Free	
9	Application Layer	Ch 10	Tutorial 4	
10	Mobile IP	Ch 8	Lab 4	
11	Wireless Networks	Ch 4	Tutorial 5	
12	Revision and Project Submission	All Chapters	Lab 5	
13	Revision		Catch up Tutorials and Labs	

Unit resources

Required texts

Textbooks

- Behrouz A. Forouzan, Data communications & networking with TCP/IP protocol suite, 6th ed. New York: McGraw -Hill, 2021.
- or
- James F. Kurose and Keith W. Ross, Computer Networking: A Top-Down Approach Featuring the Internet, 8th ed. Boston: Pearson Addison-Wesley, 2021.

¿Recommended Texts

- Behrouz A. Forouzan, Data Communications and Networking, 4th ed. New York: McGraw-Hill, 2007
- Behrouz A. Forouzan, Data Communications and Networking, 5th ed. New York: McGraw-Hill, 2012
- Behrouz A. Forouzan, TCP/IP Protocol Suite, 4th ed. New York: McGraw-Hill, 2010.
- James F. Kurose and Keith W. Ross, Computer Networking: A Top-Down Approach Featuring the Internet, 5th ed. Boston: Pearson Addison-Wesley, 2010.

Online materials:

Lecture materials, tutorial questions and answers, assignment specifications, and other details

are available on the subject web site.

Materials and equipment

While the computers and software in Student Laboratories may be used in this

unit, it is strongly recommended that you use your own personal computers and the supplied

open source software for assignment work.

Unit website

Each unit you are enrolled in has an online teaching site in the learning management system UCLearn. You access UCLearn through MyUC.

Assessment

Assessment item details

Group Project

Due date

Friday Week 12

Weighting

70%

Assessment details

Description: A challenging protocol stack-designing project, that needs to be done in groups

Feedback: Students will be provided online feedback via Canvas Site.

Addresses learning outcomes

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

- 1. Demonstrate an understanding of the discipline of network engineering, its importance and relevance to digital communication and communities of practice;
- 2. Describe the building blocks that form a modern network;
- 3. Demonstrate an understanding of the practical and theoretical background to support studying later units in the area; and
- 4. Demonstrate an understanding of the basic issues in network management and how to set up and manage simple data networks.

Related graduate attributes

1. UC graduates are professional
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    - reflect on their own practice, updating and adapting their knowledge and skills for continual professional and academic development

Lab Reports

Due date

Fortnightly

Weighting

15%

Assessment details

Lab Reports

Due Date: Fortnightly

Weighting: 5 Labs each weighing 3%: Total 15%

Description: Simulation based laboratory experiments

Feedback: Students will be provided online feedback via Canvas Site. Special consultation session may also be organised by appointment. Late submission penalties applicable

Addresses learning outcomes

Related graduate attributes

1. UC graduates are professional
    - communicate effectively
    - employ up-to-date and relevant knowledge and skills
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Tutorial Reports

Due date

Fortnightly

Weighting

15%

Assessment details

Tutorial Reports

Due Date: Fortnightly

Weighting: 5 Tutes each weighing 3%: Total 15%

Description: Tutorials based on content convered in class

Feedback: Students will be provided online feedback via Canvas Site. Special consultation session may also be organised by appointment. Late submission penalties applicable

Addresses learning outcomes

Related graduate attributes

1. UC graduates are professional
    - communicate effectively
    - employ up-to-date and relevant knowledge and skills
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Extensions

Students can apply for an extension to the submission due date for an assessment item due to extenuating, evidenced circumstances (specific details are found in the Assessment Procedures). An extension must be applied for before the due date. Documentary evidence (e.g. medical certificate) will be expected for an extension to be granted, however this will not guarantee that the application will be successful. The Unit Convener or relevant Program Director/Course Convener will decide whether to grant an extension and the length of the extension.

An Assignment Extension form is available from the Student Forms page.

Late submissions

The following late submission period and penalty is applicable to any teaching period commencing after 1 April 2024.

To support the provision of timely feedback to students within the unit, late penalties will apply for summative assessments where late submission is permitted. Late submissions without an approved extension or reasonable adjustment will result in a penalty of a mark reduction of 10% of the maximum available marks for the assessment item per day (or part thereof) up to and including three calendar days. If a student submits more than three calendar days late without an approved extension or reasonable adjustment, the student will be allocated a mark of zero for that assessment, with no feedback provided.

Approval of extensions based on extenuating circumstances will be dependent upon the production of supporting documentation and at the discretion of the unit convener.

For teaching periods commencing prior to 1 April 2024, a late penalty of 5 % of the maximum available marks for the assessment item per day (or part thereof) was applied up to and including seven calendar days. An assignment submitted over 7 days late will not be accepted.

Special assessment requirements

Normally an aggregate mark of 50% is required to pass the unit.

The final grade for the subject is then determined according to the following table:

85 <= Final mark <= 100	Final grade = HD
75 <= Final mark < 85	Final grade = DI
65 <= Final mark < 75	Final grade = CR
50 <= Final mark < 65	Final grade = P
0 <= Final mark < 50	a final grade (NX, NC, or NN)

Supplementary assessment

Refer to the Assessment Policy and Assessment Procedures

Academic integrity

Students have a responsibility to uphold University standards on ethical scholarship. Good scholarship involves building on the work of others and use of others' work must be acknowledged with proper attribution made. Cheating, plagiarism, and falsification of data are dishonest practices that contravene academic values. Refer to the University's Student Charter for more information.

To enhance understanding of academic integrity, all students are expected to complete the Academic Integrity Module (AIM) at least once during their course of study. You can access this module within UCLearn (Canvas) through the 'Academic Integrity and Avoiding Plagiarism' link in the Study Help site.

Use of Text-Matching Software

The University of Canberra uses text-matching software to help students and staff reduce plagiarism and improve understanding of academic integrity. The software matches submitted text in student assignments against material from various sources: the internet, published books and journals, and previously submitted student texts.

Student responsibility

Learner engagement

Activity	Time (hrs)
Lectures attending (2*12)	24
Lectures preparation (2*12)	24
Tutorials/Labs attending (1*11)	11
Tutorials/Labs preparation (1*11)	11
Project - Research	40
Project - Writing	40
Total	150

Inclusion and engagement

It is strongly recommended that students who need assistance in undertaking the unit because of disability or an ongoing health condition register with the Inclusion and Engagement Office as soon as possible so that reasonable adjustment arrangements can be made.

Participation requirements

Your participation in both class and online activities will enhance your understanding of the unit content and therefore the quality of your assessment responses. Lack of participation may result in your inability to satisfactorily complete assessment items.

Withdrawal

If you are planning to withdraw please discuss with your Unit Convener. UC College students must also seek advice from the College.

Required IT skills

This unit involves online meetings in real time using the Virtual Room in your UCLearn teaching site. The Virtual Room allows you to communicate in real time with your lecturer and other students. To participate verbally, rather than just typing, you will need a microphone. For best audio quality we recommend a microphone and speaker headset. For more information and to test your computer, go to the Virtual Room in your UCLearn site and 'Join Course Room'. This will trigger a tutorial to help familiarise you with the functionality of the virtual room.

Work integrated learning

n/a

Additional information

n/a

Student feedback

All students enrolled in this unit will have opportunities to provide anonymous feedback on the unit through the InterFace Student Experience Questionnaire (ISEQ). The request for your feedback will be posted on your InterFace page at least twice during a teaching period. InterFace can be accessed through MyUC.

Changes to unit based on student feedback

Assessments updated as per feedback received.

Authority of this unit outline

This unit outline must be read in conjunction with the University of Canberra's Policies and Procedures, including the Assessment Policy and associated Procedure. The Assessment Policy and Assessment Procedure include information on matters such as plagiarism, grade descriptors, moderation, feedback, and deferred exams.

Any change to the information contained in the Academic content and Assessment sections of this document, will only be made by the Unit Convener if the written agreement of the Program Director and a majority of students has been obtained; and if written advice of the change is then provided on the teaching site in UCLearn. If this is not possible, written advice of the change must be then forwarded to each student enrolled in the unit at their registered term address. Any individual student who believes themselves to be disadvantaged by a change is encouraged to discuss the matter with the Unit Convener.

Authority Text

Main

> Exception – Potential changes to a unit's learning activities and assessment items (Approved Academic Board 2020)
>
> In the event of Australian Government and/or ACT Government directive, such as those requiring physical distancing and restrictions on movement because of a pandemic, learning activities and/or assessment items in some units may change. These changes will not be updated in the published Unit Outline but will be communicated to students via the unit's UCLearn (Canvas) teaching site. The new learning activities and/or assessment items will continue to meet the unit's learning outcomes, as described in the Unit Outline.
>
> New learning activities and/or assessment items will be available on the unit's UCLearn (Canvas) teaching site. Please contact the Unit Convener with any questions.

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UC acknowledges the Ngunnawal people, traditional custodians of the lands where Bruce campus is situated. We wish to acknowledge and respect their continuing culture and the contribution they make to the life of Canberra and the region. We also acknowledge all other First Nations Peoples on whose lands we gather.