Faculty of Science, Engineering and Built Environment

SIT202 Networks and Communications

Deakin University Unit Guide

Trimester 2, 2019

CONTENTS

WELCOME

Welcome to the unit **SIT202 Networks and Communications.** In this unit we will undertake a study of all aspects of how modern computer networks work, from low-level physical devices and transmission technologies through to the communication protocols that enable network applications to function.

Please take the time to familiarise yourself with the information provided in this unit guide and the resources made available to you through the unit site, accessed in DeakinSync. Make sure you check the unit site for this unit regularly for updates throughout the trimester (at least twice weekly).

If you have any queries regarding the unit, or you are facing problems that may impact upon your performance in the unit, please contact the unit chair and/or your lecturer as soon as possible.

We wish you the best of luck in your studies of SIT202 and hope you enjoy this trimester.

The SIT202 Team

This Unit Guide provides you with the key information about this Unit. For the best chance of success, you should read it very carefully and refer to it frequently throughout the trimester. Your Unit site (accessed in **DeakinSync**) also provides information about your **rights and responsibilities.** We will assume you have read this before the Unit commences, and we expect you to refer to it throughout the trimester.

WHO IS THE UNIT TEAM?

Unit chair: leads the teaching team and is responsible for overall delivery of this unit

Jinho Choi

Unit chair details

Campus:	Melbourne Burwood Campus 221 Burwood Highway BURWOOD VIC 3125
Email:	jinho.choi@deakin.edu.au
Phone:	+61 3 924 46557

Other members of the team and how to contact them

Geelong Waurn Ponds Campus Leader: contact the campus leader for assistance at your campus

Name: Justin Rough, Lecturer

Email: justin.rough@deakin.edu.au

Phone: +61 3 522 71233

Administrative queries

- Contact your Unit Chair or Campus Leader
- Drop in or contact Student Central to speak with a Student Adviser

For additional support information, please see the Rights and Responsibilities section under 'Resources' in your unit site

ABOUT THIS UNIT

Computer networks, and the applications they support, have caused many significant changes to society in recent years. Books, newspapers, music, and video are now all either delivered differently or are being replaced by new media. Communication services such as postal mail, telephony, and television, are now undergoing significant changes and improvements resulting from improved computer networks. New applications are also being driven by computer networks, such as the Internet of Things and Cloud Computing. In SIT202, students will learn how computer networks are constructed, how they work, and how modern applications use the services provided by modern computer networks. The concept of protocol layering will be explored to learn how computer networks operate, using the OSI model and TCP/IP protocol suite as examples, including an examination of the functionality and protocols provided by the different layers of these systems. Through practical tasks students will learn how to construct and configure computer networks and how various network protocols act and react to establish a functioning computer network.

Unit development in response to student feedback

Every trimester, we ask students to tell us, through eVALUate, what helped and hindered their learning in each Unit. You are strongly encouraged to provide constructive feedback for this Unit when eVALUate opens (you will be emailed a link).

In previous versions of this unit, students have told us that these aspects of the Unit have helped them to achieve the learning outcomes:

- Depth of content, particularly in the lectures, developing a strong understanding of how the network protocol stack works and in-depth coverage of IP, TCP, and UDP;
- Weekly practicals were helpful, teaching skills relevant to the workplace and helping develop understanding of theory content;
- Assessment tasks required knowledge and the application of problem solving skills rather than answers found easily online;
- Opportunities for interacting with the unit staff in classes, practicals, Bb Collaborate sessions, online forums and email.

They have also made suggestions for improvement, and so this is what we have done:

- Most suggestions focus on assessment, with students struggling with the workload and difficulty of the questions and issues with the marking consistency. We have applied a new approach in the assessments in an attempt to resolve these issues.
- The second most common suggestion is with regard to workload, which is largely due to difficulties encountered with assessment but also the nature of the unit content. We have aimed to resolve the issue, as much as possible, by adjusting the assessment approach.

If you have any concerns about the Unit during the trimester, please contact the unit teaching team - preferably early in the trimester - so we can discuss your concerns, and make adjustments, if appropriate.

Your course and Deakin's Graduate Learning Outcomes

GLO1	Discipline knowledge and capabilities:	appropriate to the level of study related to a discipline or profession

GLO2	Communication:	using oral, written and interpersonal communication to inform, motivate and effect change
GLO3	Digital literacy:	using technologies to find, use and disseminate information
GLO4	Critical thinking:	evaluating information using critical and analytical thinking and judgment
GLO5	Problem solving:	creating solutions to authentic (real world and ill-defined) problems
GLO6	Self-management:	working and learning independently, and taking responsibility for personal actions
GLO7	Teamwork:	working and learning with others from different disciplines and backgrounds
GLO8	Global citizenship:	engaging ethically and productively in the professional context and with diverse communities and cultures in a global context

Each Deakin course has **course learning outcomes** which explain what the Deakin Learning Outcomes mean in your discipline. Learning in each unit builds towards the course learning outcomes.

Your Unit Learning Outcomes

Each Unit in your course is a building block towards these Graduate Learning Outcomes - not all Units develop and assess every Graduate Learning Outcome (GLO).

	These are the Learning Outcomes (ULO) for this Unit **At the completion of this unit successful** students can:	Deakin Graduate Learning Outcomes
ULO1	Demonstrate knowledge of concepts and roles of computer architecture and the influence of different layers of communication protocols.	GLO1
ULO2	Differentiate the types of networks, communication and user oriented protocols, and their influence on transmission speed, reliable delivery and security.	GLO1, GLO4
ULO3	Select a local area and design simple protocols for a given environment to track current and future trends in computer networks	GLO4, GLO5
ULO4	Analyse and articulate security attacks and countermeasures, symmetric and public cryptosystems, digital signature and authentication protocols	GLO1, GLO2, GLO4

ASSESSING YOUR ACHIEVEMENT OF THE UNIT LEARNING OUTCOMES

Overview

In brief, these are the assessment tasks for this Unit (details below):

Three problem solving reports (15%, 15%, 10%) 40%, examination 60%

Summative assessments

(tasks that will be graded or marked)
NOTE: It is <u>your responsibility</u> to keep a backup copy of every assignment where it is possible (eg written/digital reports, essays, videos, images). In the unusual event that one of your assignments is misplaced, you will need to submit the backup copy. Any work you submit may be checked by electronic or other means for the purposes of detecting collusion and/or plagiarism.

When you are required to submit an assignment through your unit site (accessed in DeakinSync), you should receive an email to your Deakin email address confirming that it has been submitted. You should check that you can see your assignment in the Submissions view of the Assignment folder after upload, and check for, and keep, the email receipt for the submission.

- Summative assessment task 1

	Problem Solving Report 1
Brief description of assessment task	Short answer questions focusing on concepts from Weeks 1-3 including network overview, the physical layer, and the data link layer.
Detail of student output	This is an individual assessment task. Word processed document, usually 4-8 pages long depending on the length and quality of answers.
Grading and weighting (% total mark for unit)	15% You will receive an overall mark for the task (out of 100) indicating your overall performance and comments indicating where you lost marks and why.
This task assesses your achievement of these Unit Learning Outcome(s)	ULO1 – You will be required to demonstrate knowledge of concepts and the architecture of computer networks, including protocol layering, and services provided by layers. ULO2 – You will be required to demonstrate knowledge of the different types of networks and protocols and how they influence the various characteristics of networks for the transmission of data between devices on a computer network.
This task assesses your achievement of these Graduate Learning Outcome(s)	GLO1 - You will be required to work with content relevant to computer networks and the IT discipline in general. GLO4 - You will be required to analyse one or more computer network technologies, identify and explain the expected influence of such technologies on the characteristics of the network.
How and when you will receive feedback on your work	Students will have the opportunity to seek feedback and guidance during contact hours, online discussion forums and sessions, and private consultations. Marks and feedback for the submitted task will generally be returned within 10-15 business days after submission.
When and how to submit your work	This assessment task is due by 11:59 pm (AEST) on Friday of Week 4, (2 August) and submission is via the unit site (accessed in DeakinSync).

- Summative assessment task 2

	Problem Solving Report 2
Brief description of assessment task	Short answer questions focusing on concepts from Weeks 4-6 including the network layer and the transport layer.
Detail of student output	This is an individual assessment task. Word processed document, usually 4-8 pages long depending on the length and quality of answers.
Grading and weighting (% total mark for unit)	15% You will receive an overall mark for the task (out of 100) indicating your overall performance and comments indicating where you lost marks and why.
This task assesses your achievement of these Unit Learning Outcome(s)	ULO2 – You will be required to demonstrate knowledge of concepts and the protocols involved in supporting the delivery of data between devices on a computer network and/or interconnected networks. ULO3 – You will be required to consider the design of a simple protocol for the delivery of data between devices, and evaluate the protocol to identify strengths and/or weaknesses.
This task assesses your achievement of these Graduate Learning Outcome(s)	GLO1 - You will be required to work with content relevant to computer networks and the IT discipline in general. GLO4 - You will be required to analyse one or more computer network technologies, identify and explain the expected influence and interactions of such technologies on the delivery of data in computer networks. GLO5 - You will be required to consider design a simple protocol for the delivery of data between devices and evaluate the features and/or services of that protocol.

How and when you will receive feedback on your work	Students will have the opportunity to seek feedback and guidance during contact hours, online discussion forums and sessions, and private consultations. Marks and feedback for the submitted task will generally be returned within 10-15 business days after submission.
When and how to submit your work	This assessment task is due by 11.59 pm (AEST) on the Friday of Week 7, (30 August) and submission is via the unit site (accessed in DeakinSync).

- Summative assessment task 3

	Problem Solving Report 3
Brief description of assessment task	Short answer questions drawing on the unit content covered to date, but focusing on concepts from Weeks 7-9, including the transport layer, the application layer, and security.
Detail of student output	This is an individual assessment task. Presentation slides (no length expectation) and a word processed document, usually 3-6 pages long depending on the length and quality of answers
Grading and weighting (% total mark for unit)	10% You will receive an overall mark for the task (out of 100) indicating your overall performance and comments indicating where you lost marks and why.
This task assesses your achievement of these Unit Learning Outcome(s)	ULO3 – Given current and future requirements for one or more networks, you will be required to select/design appropriate protocols to satisfy those requirements ULO4 – You will be required to analyse one or more networks to explain the security requirements of those networks and propose solutions.
This task assesses your achievement of these Graduate Learning Outcome(s)	GLO1 - You will be required to work with content relevant to computer networks and the IT discipline in general. GLO2 - You will be required to prepare a presentation to explain one or more aspects of protocol design and/or security protocols. GLO4 - You will be required to analyse networks and their requirements and explain how those requirements impact protocol design and/or security protocols. GLO5 - You will be required to propose and justify solutions addressing networks and their requirements.
How and when you will receive feedback on your work	Students will have the opportunity to seek feedback and guidance during contact hours, online discussion forums and sessions, and private consultations. Marks and feedback for the submitted task will generally be returned within 10-15 business days after submission, but before the scheduled date of the examination.
When and how to submit your work	This assessment task is due by 11.59 pm (AEST) on the Friday of Week 10, (20 September) and submission is via the unit site (accessed in DeakinSync).

- Summative assessment task 4

	Examination
Brief description of assessment task	Consisting of two sections, multiple choice and short answer. Questions are drawn from the entire body of unit content.
Detail of student output	Completed multiple choice answer sheet (MCAS) and written script book demonstrating understanding / achievement of the Unit Learning Outcomes.
Grading and weighting (% total mark for unit)	60% The result of your examination will be included in your final mark and grade released by the Division of Student Administration.

This task assesses your achievement of these Unit Learning Outcome(s)	ULO1 – You will be required to demonstrate knowledge of concepts and architectures of computer networks, including protocol layering, and services provided by layers. ULO2 – You will be required to explain different types of networks and the influence of protocols on transmission speed, reliable delivery, and security. ULO3 – You will be required to explain the design of protocols and how they address current and future trends in computer networks. ULO4 – You will be required to explain security attacks, countermeasures, and various security protocols used in computer networks.
This task assesses your achievement of these Graduate Learning Outcome(s)	GLO1 - You will be required to work with content relevant to computer networks and the IT discipline in general. GLO4 - You will be presented with one or more scenarios of networks and be required to explain the problems encountered by those networks and explain the requirements of any solution/s. GLO5 - You will be presented with one or more scenarios of networks and be required to propose protocols and/or design protocols to address current and/or future requirements of those networks.
How and when you will receive feedback on your work	Students will have the opportunity to complete a mock exam and seek feedback during contact hours, online discussion forums and sessions, and private consultations.
When and how to submit your work	Students will be required to attend a two hour supervised examination during the end of trimester examination period. It is the responsibility of students to review their examination timetable when it is released via DeakinSync.

Your learning experiences in this Unit - and your expected commitment

To be successful in this unit, you must:

- Read all materials in preparation for your classes or seminars, and follow up each with further study and research on the topic;
- Start your assessment tasks well ahead of the due date;
- Read or listen to all feedback carefully, and use it in your future work;
- Attend and engage in all timetabled learning experiences as follows:

Scheduled learning activities - campus

3 x 1 hour classes per week, 1 x 2 hour practical per week.

Scheduled learning activities - cloud

1 x 1 hour scheduled online workshop per week.

Students will on average spend 150 hours over the trimester undertaking learning and assessment activities in this unit. For campus students this includes class time, designated activities in the practical sessions, assessment tasks, readings and study time. For cloud students the time should be divided between online learning activities, discussion boards, assessment tasks, readings and study time.

Many resources are provided for your learning experiences in this unit, including:

- Weekly Readings - each week there are listed one or more sections of the prescribed textbook that should be read. Some of these sections are indicated as prescribed reading, i.e., this content is required learning and is assessable (may appear on assessment tasks including the exam). Other readings are indicated as recommended, which may provide

further background information or assist in understanding other prescribed topics;
- PowerPoint slides - these slides are used during the weekly timetabled "classes" for which recordings will also be made available later. The slides can provide a good basis for preparing your own summary and/or review of unit content, and also often clarify concepts that are difficult to understand;
- Practical tasks - laboratory tasks requiring you to work with Cisco enterprise routers and switches are provided and are required to be completed by campus-linked students (in physical labs) and cloud-linked students (who will be granted access to NetLab for this purpose). These tasks will provide some insight into how networks are constructed however the focus of these lab tasks is to gain understanding of how various important network protocols work;
- Cloud resources - although it is unclear exactly what cloud resources will be made available as only initial planning has begun at the time of writing this unit guide, it is generally expected that you will find several videos examining some content of the unit (particularly low-level concepts) and quizzes reviewing unit content (both theoretical and practical);
- Problem Solving Reports - the unit requires three Problem Solving Reports to be completed during the trimester which are designed to be reasonably challenging but relatively easy to complete for those who have been undertaking the required studies. In general, it should not be possible to find an answer in the textbook or using a web search that can be simply reworded/paraphrased, however it should be relatively easy to identify the required information in the text/web and prepare answers to the questions on the basis of that information. In other words, the assessment examines your ability to work with the knowledge of networks you develop during your studies, not your ability to simply find information sources describing networks.
- Interacting with unit staff - the staff assigned for teaching the unit are also a fantastic resource that you should seek to utilise effectively during your studies. In particular, you should not view staff simply as the people assigned to deliver the unit content, but as experts in the field of networking whom you can discuss the various concepts and ideas of computer networks relevant to the unit, but also regarding concepts that go beyond the concepts covered in the unit. You can access unit staff through email and the discussion forums in the unit site. Campus-linked students can also access unit staff during timetabled activities. Cloud-linked students can also access unit staff during Bb Collaborate sessions.
- Interacting with other students - other students can also provide a useful resource. Find something useful for the unit or of general interest? Consider posting that to the unit site discussion forums. Having problems understanding a particular topic? You can discuss that with other students during timetabled activities (campus-linked), Bb Collaborate sessions (Cloud-linked), or using the discussion forums in the unit site.

Note

At Deakin,

- *Lectures* are referred to as *classes* (definition: a general meeting for all students, for which students do not need to register and where students are engaged through presentations and learning activities)
- *Tutorials, workshops and seminars* are referred to as seminars (definition: more interactive meetings for smaller groups of students).
- For the complete list of agreed definitions for learning experiences, see the Course Design and Delivery Procedure.

UNIT LEARNING RESOURCES

Your unit learning resources are available in your unit site accessed in DeakinSync.

Prescribed text

Behrouz A. Forouzan, 2012, Data Communications and Networking, 5th edition, Mcgraw Hill

Essential learning resources

The prescribed textbook for this unit is listed above.

Textbooks, reference books, general books and software may be ordered from the bookshop:

- phone 1800 686 681 (freecall);
- email to DUSA-Bookshop@deakin.edu.au; or
- order online from the University bookshop web site at http://www.dusabookshop.com.au/

Recommended learning resources

Suitable reference books for this unit include:

- J. Kurose and K. Ross, Computer Networking: A Top-Down Approach (Seventh Edition), Pearson Education, 2017, ISBN-13:978-0-13-359414-0.
- W. Stallings, Data and Computer Communications (10th Edition), Pearson Education, 2014, ISBN-13: 978-0-13-350648-8.
- A.S. Tanenbaum and D.J. Weatherall, Computer Networks (Fifth Edition), Pearson Education, 2011, ISBN-13: 978-0--3-212695-3.

KEY DATES FOR THIS TRIMESTER

Trimester begins (classes begin)	Monday 8 July 2019
Intra-trimester break (a short break during trimester)	Monday 12 August - Sunday 18 August 2019
Trimester ends (classes cease)	Thursday 26 September 2019
Study period (examination preparation period)	Monday 30 September - Friday 4 October 2019
Examinations begin	Monday 7 October 2019
Examinations end	Friday 18 October 2019
Inter-trimester break (the period between trimesters)	Monday 21 October - Friday 8 November 2019
Unit results released	Thursday 7 November 2019 (6pm)

UNIT WEEKLY ACTIVITIES

Week	Commencing	Topic	Assessment activity
1	8 July 2019	Welcome and Introduction	
2	15 July	The Physical Layer	
3	22 July	The Physical and Data-Link Layers	
4	29 July	The Data-Link Layer	**Problem Solving Report 1**
5	5 August	The Network Layer	
6	19 August	Routing Protocols and IPv6	
7	26 August	The Transport Layer	**Problem Solving Report 2**
8	2 September	The Application Layer	

9	9 September	The Application Layer II	
10	16 September	Security	**Problem Solving Report 3**
11*	23 September	Unit Review and Exam Hints	

Intra-trimester break: **Monday 12 August - Sunday 18 August 2019** (between weeks 5 and 6)

***Friday 27 September:** AFL Grand Final Eve public holiday - University closed