COMP6250
Data Communication
Session 1, Weekday attendance, North Ryde 2020
Dept of Computing

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**General Information**

Unit convenor and teaching staff

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Credit points
10

Prerequisites

Corequisites

Co-badged status

Unit description

This unit introduces basic data communication concepts, theory and practice within the context of the use of communication networks in organisations. Topics include: protocols and standards, including the OSI model; in-depth understanding of key protocols of the TCP/IP protocol suite; network switching and routing, including both intra-domain and inter-domain routing protocols; multicast protocols; LAN and WAN topologies; wireless networking; network hardware, such as routers, modems, repeaters, switches and hubs; public telecommunication-based data services; the effect of telecommunications on society; the role of telecommunications within organisations; introduction to security and network management; organisational management of telecommunications; introduction to network design; and regulatory frameworks. Practical work includes basic network hardware set up and protocol performance in a specialised laboratory using dedicated switching and routing equipment. This unit does not presume any knowledge of programming nor is there any programming work in the unit.

**Important Academic Dates**

Information about important academic dates including deadlines for withdrawing from units are available at [https://students.mq.edu.au/important-dates](https://students.mq.edu.au/important-dates)

**Learning Outcomes**

**ULO1:** Enunciate the importance and the role of network protocols including why they are organised into protocol stacks and how protocol stacks function.

**ULO2:** Demonstrate an understanding of network addressing, routing of traffic between
networks and the mechanisms that allow applications to co-exist and interact.

**ULO3:** Differentiate among LAN components, describe addressing schemes at various layers and how they interact, techniques to resolve them, and in particular instances calculate addresses.

**ULO4:** Critically reflect on different major network technologies including wireless, backbone, wide area networks, and the Internet and, being aware of their properties, be able to evaluate different network designs.

**ULO5:** Demonstrate technical networking proficiency including demonstrated ability to configure, construct, and document, and in simple cases, design networks, as well as the ability to perform traffic analysis on local area networks.

**ULO6:** Demonstrate an understanding of, and have an ability to develop plans for dealing with, issues regarding network security and management.

### General Assessment Information

#### Assignments

Assignment work must be written clearly, with good grammar, correct word usage, correct punctuation, and lack of spelling errors. Poor or bad expression will be penalized. Wherever required, all written work must be properly referenced and conform to standard stylistic conventions.

#### Late Submissions

No extensions will be granted without an approved application for Special Consideration. There will be a deduction of 10% of the total available marks made from the total awarded mark for each 24 hour period or part thereof that the submission is late. For example, 25 hours late in submission for an assignment worth 10 marks – 20% penalty or 2 marks deducted from the total. No submission will be accepted after solutions have been posted.

#### Practicals

*Note* that while the practical material is structured against the lecture material, you need to keep in mind that there will not always be a one to one mapping between the practical exercises and the lecture topics. This is because you need some practical sessions to get acquainted to new tools and devices thereby limiting the number of practical time slots available to experiment with technologies discussed in some lectures.
Assessment Tasks

<table>
<thead>
<tr>
<th>Name</th>
<th>Weighting</th>
<th>Hurdle</th>
<th>Due</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignment 1</td>
<td>15%</td>
<td>No</td>
<td>Week 6</td>
</tr>
<tr>
<td>Module Exams</td>
<td>60%</td>
<td>No</td>
<td>Various (see unit schedule)</td>
</tr>
<tr>
<td>Practical Workshops</td>
<td>10%</td>
<td>Yes</td>
<td>Weekly</td>
</tr>
<tr>
<td>Assignment 2</td>
<td>15%</td>
<td>No</td>
<td>Week 12</td>
</tr>
</tbody>
</table>

Assignment 1
Assessment Type ¹: Report
Indicative Time on Task ²: 14 hours
Due: Week 6
Weighting: 15%

The first assignment tests students understanding of network stacks, layering, and addressing techniques.

On successful completion you will be able to:

- Enunciate the importance and the role of network protocols including why they are organised into protocol stacks and how protocol stacks function.
- Demonstrate an understanding of network addressing, routing of traffic between networks and the mechanisms that allow applications to co-exist and interact.
- Differentiate among LAN components, describe addressing schemes at various layers and how they interact, techniques to resolve them, and in particular instances calculate addresses.

Module Exams
Assessment Type ¹: Examination
Indicative Time on Task ²: 18 hours
Due: Various (see unit schedule)
Weighting: 60%

The module examinations ask students to answer conceptual questions about the course material as well as solve simple networking problems. Module exams are run in the first hour of the workshop in which the student is enrolled. Students may only attend module exams in workshops they are enrolled in. In the case a student cannot attend a module exam, a request for special consideration must be made. Four module examinations are each offered up to two times during semester. The student's best mark for each module is used in their final mark.
Modules 1 and 3 are each worth 10% of the final grade.

Modules 2 and 4 are each worth 20% of the final grade.

On successful completion you will be able to:

- Enunciate the importance and the role of network protocols including why they are organised into protocol stacks and how protocol stacks function.
- Demonstrate an understanding of network addressing, routing of traffic between networks and the mechanisms that allow applications to co-exist and interact.
- Differentiate among LAN components, describe addressing schemes at various layers and how they interact, techniques to resolve them, and in particular instances calculate addresses.
- Critically reflect on different major network technologies including wireless, backbone, wide area networks, and the Internet and, being aware of their properties, be able to evaluate different network designs.
- Demonstrate technical networking proficiency including demonstrated ability to configure, construct, and document, and in simple cases, design networks, as well as the ability to perform traffic analysis on local area networks.
- Demonstrate an understanding of, and have an ability to develop plans for dealing with, issues regarding network security and management.

Practical Workshops

Assessment Type: Demonstration

Indicative Time on Task: 13 hours

Due: Weekly

Weighting: 10%

This is a hurdle assessment task (see assessment policy for more information on hurdle assessment tasks)

The practical work in this unit makes up 10% of your mark. The practical work is divided up into twelve sections. Practical classes are a hurdle requirement, and, as such, you will be required to perform to a satisfactory standard in at least eight of the practical classes to pass the unit. Each practical contributes 1% of your total mark for the unit, the total mark will be made by taking the total of the best 10 practical session marks.

To receive your marks you must attend the practical section and demonstrate your completion of the section to your practical supervisor. Earning the marks will require not only the successful completion of the exercises but the presentation of appropriate documentation, as outlined in the question sheets. You must complete the practical session in the week it is allocated.

Practical classes will commence during week 1 of the semester.
On successful completion you will be able to:

- Enunciate the importance and the role of network protocols including why they are organised into protocol stacks and how protocol stacks function.
- Demonstrate an understanding of network addressing, routing of traffic between networks and the mechanisms that allow applications to co-exist and interact.
- Differentiate among LAN components, describe addressing schemes at various layers and how they interact, techniques to resolve them, and in particular instances calculate addresses.
- Demonstrate technical networking proficiency including demonstrated ability to configure, construct, and document, and in simple cases, design networks, as well as the ability to perform traffic analysis on local area networks.
- Demonstrate an understanding of, and have an ability to develop plans for dealing with, issues regarding network security and management.

Assignment 2

Assessment Type 1: Report
Indicative Time on Task 2: 14 hours
Due: Week 12
Weighting: 15%

The second assignment tests students understanding of selected networking technologies.

On successful completion you will be able to:

- Critically reflect on different major network technologies including wireless, backbone, wide area networks, and the Internet and, being aware of their properties, be able to evaluate different network designs.
- Demonstrate technical networking proficiency including demonstrated ability to configure, construct, and document, and in simple cases, design networks, as well as the ability to perform traffic analysis on local area networks.
- Demonstrate an understanding of, and have an ability to develop plans for dealing with, issues regarding network security and management.

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1 If you need guidance or support to understand or complete this type of assessment, please contact the Learning Skills Team

2 Indicative time-on-task is an estimate of the time required for completion of the assessment task and is subject to individual variation
Delivery and Resources

Classes
Each week you should attend three hours of lectures, and a two hour practical workshop. For details of days, times and rooms consult the timetables webpage.

Note that practicals workshops (lab sessions) commence in week 1. The week-by-week details of the practical (lab) classes will be available from iLearn.

You must attend the practicals that you are enrolled in.

Textbook and Reading Materials
The textbook for this semester is:


Additional reading that you may find useful for this unit:


BE CAREFUL to buy correct Comer book!


Web Resources

Unit Websites
COMP6250 is administered via iLearn (http://ilearn.mq.edu.au/).

This unit outline can be found in the university’s unit guides.

Lecture recordings
Digital recordings of lectures may be available. When available they will be linked from iLearn.

Technologies Used and Required
In this unit you will be exposed to the following technology and tools:

- HP networking equipment and the Comware network operating system.
- Wireshark Packet Analyzer software.

General Notes
In this unit, you should do the following:
- Attend lectures, take notes, ask questions.
- Attend your weekly Practical session.
- Ensure that you attend module exams during the first hour of your practical session.
- Read appropriate sections of the text, add to your notes and prepare questions for your lecturer/tutor.
- Work on any assignments that have been released.

Lecture notes will be made available each week but these notes are intended as an outline of the lecture only and are not a substitute for your own notes or the recommended reading list.

**Unit Schedule**

Tentative teaching schedule, subject to change:

<table>
<thead>
<tr>
<th>Week</th>
<th>Module</th>
<th>Lecture Topic</th>
<th>Module Exam</th>
<th>Weight</th>
<th>Assignments</th>
<th>Reading</th>
<th>Practical</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Networking Fundamentals (NF)</td>
<td>Introduction</td>
<td></td>
<td></td>
<td>Ch 1, 2, 5</td>
<td>Wireshark Intro</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>LANs</td>
<td></td>
<td></td>
<td></td>
<td>Ch 13, 14, 15</td>
<td>Network OS and Command Line</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Layers and Stacks (LS)</td>
<td>Network Layer</td>
<td>NF (30 min)</td>
<td>10%</td>
<td>Ch 20, 21</td>
<td>IP Headers</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Application Layer, Transport Layer - UDP</td>
<td></td>
<td></td>
<td></td>
<td>Ch 25</td>
<td>Subnetting</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Transport Layer - TCP</td>
<td></td>
<td></td>
<td></td>
<td>Ch 26</td>
<td>Transport and Application Layers</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Link Layer</td>
<td></td>
<td>Assignment 1</td>
<td></td>
<td>Ch 14, 15</td>
<td>Switches, MAC, ARP</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Physical Layer</td>
<td></td>
<td></td>
<td></td>
<td>Ch 6, 7, 8, 9</td>
<td>Good Friday</td>
<td></td>
</tr>
</tbody>
</table>

Mid Semester Break

| 8    | Network Security (NS) | Network Security I | LS (60 min) | 20%    | Ch 30 | TBD |
| 9    | Network Security II | | | | Ch 30 | TBD |
| 10   | Internetworking and Network Architecture (IA) | IP Routing | NS (30 min) | 10%    | Ch 18, 22 | Static Routing |

[https://unitguides.mq.edu.au/unit_offerings/122166/unit_guide/print](https://unitguides.mq.edu.au/unit_offerings/122166/unit_guide/print)
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). 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.)

Students seeking more policy resources can visit the 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 (https://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 or if you are a Global MBA
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) 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 Enquiry Service

For all student enquiries, visit Student Connect at ask.mq.edu.au

If you are a Global MBA student contact globalmba.support@mq.edu.au

Equity 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.

IT Help

For help with University computer systems and technology, visit 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.

Grading

At the end of the semester, you will receive a grade that reflects your achievement in the unit

- **Fail (F)**: does not provide evidence of attainment of all learning outcomes. There is missing or partial or superficial or faulty understanding and application of the fundamental concepts in the field of study; and incomplete, confusing or lacking communication of ideas in ways that give little attention to the conventions of the discipline.
- **Pass (P)**: provides sufficient evidence of the achievement of learning outcomes. There is demonstration of understanding and application of fundamental concepts of the field of study; and communication of information and ideas adequately in terms of the
conventions of the discipline. The learning attainment is considered satisfactory or adequate or competent or capable in relation to the specified outcomes.

- **Credit (Cr):** provides evidence of learning that goes beyond replication of content knowledge or skills relevant to the learning outcomes. There is demonstration of substantial understanding of fundamental concepts in the field of study and the ability to apply these concepts in a variety of contexts; plus communication of ideas fluently and clearly in terms of the conventions of the discipline.

- **Distinction (D):** provides evidence of integration and evaluation of critical ideas, principles and theories, distinctive insight and ability in applying relevant skills and concepts in relation to learning outcomes. There is demonstration of frequent originality in defining and analysing issues or problems and providing solutions; and the use of means of communication appropriate to the discipline and the audience.

- **High Distinction (HD):** provides consistent evidence of deep and critical understanding in relation to the learning outcomes. There is substantial originality and insight in identifying, generating and communicating competing arguments, perspectives or problem solving approaches; critical evaluation of problems, their solutions and their implications; creativity in application.

In this unit, the final mark will be calculated by combining the marks for all assessment tasks according to the percentage weightings shown in the assessment summary.