COMP7250

Computer Networks

Session 1, In person-scheduled-weekday, North Ryde 2024

School of Computing

Contents

Disclaimer

Macquarie University has taken all reasonable measures to ensure the information in this publication is accurate and up-to-date. However, the information may change or become out-dated as a result of change in University policies, procedures or rules. The University reserves the right to make changes to any information in this publication without notice. Users of this publication are advised to check the website version of this publication [or the relevant faculty or department] before acting on any information in this publication.

General Information

Unit convenor and teaching staff
Convener/Lecturer
Marwan Adel ElTannir
marwan.eltannir@mq.edu.au

Lecturer
Rafiullah Khan
rafiullah.khan@mq.edu.au

Credit points
10

Prerequisites
Admission to MRes

Corequisites

Co-badged status
COMP8250

Unit description
This unit concerns itself with the design and implementation of real-world computer networks. We consider the various layers of modern network systems design, from the physical medium, through software protocol layers to the application protocols. Technical issues inherent to each layer are examined including routing, error detection and correction, flow control, connection management, data representation and network security management. The unit requires some background in data communications or networking, so the Computing MRes advisor should be consulted before selecting this unit.

Important Academic Dates

Information about important academic dates including deadlines for withdrawing from units are available at https://www.mq.edu.au/study/calendar-of-dates

Learning Outcomes

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

ULO1: Build, configure, and troubleshoot complex network infrastructures, incorporating advanced routing protocols and security measures to ensure robust and efficient data transmission.

ULO2: Analyse and Design Internet Routing Architectures and high-speed switching

technologies to optimize Network Performance and Scalability in Modern Communication Infrastructures.

ULO3: Apply project management tools and techniques to plan, execute, and oversee network-related projects, ensuring efficient deployment of network solutions and timely delivery of results.

ULO4: Collaborate and communicate with others in a professional setting in both written and oral form.

ULO5: Conduct professional work ethically with a high level of integrity, autonomy, and accountability.

General Assessment Information

Requirements to Pass this Unit

To pass this Unit, you must achieve a total mark equal to or greater than 50%. Please note that there are **no hurdles** in this Unit.

Late Assessment Submission Penalty

From 1 July 2022, Students enrolled in Session based units with written assessments will have the following late penalty applied. Please see https://students.mq.edu.au/study/assessment-exams/assessments for more information.

Unless a Special Consideration request has been submitted and approved, a 5% penalty (of the total possible mark) will be applied each day a written assessment is not submitted, up until the 7th day (including weekends). After the 7th day, a grade of '0' will be awarded even if the assessment is submitted. Submission time for all written assessments is set at **11:55 pm**. A 1-hour grace period is provided to students who experience a technical concern.

For any late submission of time-sensitive tasks, such as scheduled tests/exams, performance assessments/presentations, and/or scheduled practical assessments/labs, students need to submit an application for Special Consideration.

In this unit, late submissions will be accepted as follows:

- Quiz 1: NO, unless Special Consideration is granted
- Quiz 2: NO, unless Special Consideration is granted
- Assignment 1: YES, Standard Late Penalty applies
- Assignment 2: YES, Standard Late Penalty applies

Special Consideration

The Special Consideration Policy aims to support students who have been impacted by short-term circumstances or events that are serious, unavoidable, and significantly disruptive, and which may affect their performance in an Assessment. If you experience circumstances or events that affect your ability to complete the Assessments in this Unit on time, please inform the

Convenor and submit a Special Consideration Request through ask.mq.edu.au.

Technologies Used

- Cisco Packet Tracer
- Wireshark
- Cisco IoS - Hardware gear

Methods of Communication

Our primary means of communication will be through your university email and announcements on iLearn. It is crucial to consistently check your university email for important updates and information related to the course. Additionally, significant announcements will be posted on iLearn, a centralized platform for accessing vital details about the course. Should you have any queries or require assistance from the teaching staff, including the unit convenor, you have two communication channels. Firstly, you can post your queries on the iLearn discussion board, providing an interactive space for instructors and peers to engage in discussions. Alternatively, you may send emails to the corresponding addresses of the teaching staff using your university email address for official communication. Through these communication methods, we aim to ensure effective and timely dissemination of information and provide the necessary support throughout the course.

Assessment Tasks

Name	Weighting	Hurdle	Due
Assignment 1	20%	No	Friday, Week 7
Assignment 2	30%	No	Weeks 5 and 11.
Workshop	10%	No	Weekly.
Quiz 1	20%	No	Week 6
Quiz 2	20%	No	Week 10

Assignment 1

Assessment Type [1]: Problem set
Indicative Time on Task [2]: 20 hours
Due: **Friday, Week 7**
Weighting: **20%**

The problem-solving assignment serves the purpose of familiarizing students with real-world problem situations and analysis type issues. It is structured to equip students with the skills needed to analyze specific problems comprehensively and devise optimal solutions. Certain questions within this assignment requires students may necessitate extensive research and

critical thinking to identify challenges pertinent to arrive at a particular given scenario, to demonstrate their knowledge of the subject matter covered in the unit well-founded and to make decisions in light of the same in a bid to address the challenges in that scenario.practical answer.

On successful completion you will be able to:

- Analyse and Design Internet Routing Architectures and high-speed switching technologies to optimize Network Performance and Scalability in Modern Communication Infrastructures.
- Conduct professional work ethically with a high level of integrity, autonomy, and accountability.

Assignment 2

Assessment Type [1]: Project
Indicative Time on Task [2]: 40 hours
Due: **Weeks 5 and 11.**
Weighting: **30%**

In the group-based project, students are tasked with delving into a specific topic, conducting thorough research, performing critical analyses, and presenting well-founded conclusions. Throughout this assignment, students will have an opportunity to leverage not only harness their advanced networking knowledge on Computer Networks to research but also apply essential project management principles and critically analyse the relevant state-of-the-art literature tools. This assessment task not only enhances their project management skills but also deepens their understanding of advanced networking practices and their applications in the discipline and present conclusions. The assignment further allows the students to develop their team working and professional communication skills.complex, contemporary network environments.

On successful completion you will be able to:

- Analyse and Design Internet Routing Architectures and high-speed switching technologies to optimize Network Performance and Scalability in Modern Communication Infrastructures.
- Apply project management tools and techniques to plan, execute, and oversee network-related projects, ensuring efficient deployment of network solutions and timely delivery of results.
- Collaborate and communicate with others in a professional setting in both written and oral form.

- Conduct professional work ethically with a high level of integrity, autonomy, and accountability.

Workshop

Assessment Type [1]: Practice-based task
Indicative Time on Task [2]: 10 hours
Due: **Weekly.**
Weighting: **10%**

A Workshop which consists of lab work and problem solving tasks

On successful completion you will be able to:

- Build, configure, and troubleshoot complex network infrastructures, incorporating advanced routing protocols and security measures to ensure robust and efficient data transmission.
- Collaborate and communicate with others in a professional setting in both written and oral form.
- Conduct professional work ethically with a high level of integrity, autonomy, and accountability.

Quiz 1

Assessment Type [1]: Quiz/Test
Indicative Time on Task [2]: 15 hours
Due: **Week 6**
Weighting: **20%**

A short (closed book) test that will be based on the previously covered lecture topics.

On successful completion you will be able to:

- Analyse and Design Internet Routing Architectures and high-speed switching technologies to optimize Network Performance and Scalability in Modern Communication Infrastructures.
- Conduct professional work ethically with a high level of integrity, autonomy, and accountability.

Quiz 2

Assessment Type [1]: Quiz/Test
Indicative Time on Task [2]: 15 hours
Due: **Week 10**
Weighting: **20%**

A short (closed book) test that will be based on the previously covered lecture topics.

On successful completion you will be able to:

- Analyse and Design Internet Routing Architectures and high-speed switching technologies to optimize Network Performance and Scalability in Modern Communication Infrastructures.
- Conduct professional work ethically with a high level of integrity, autonomy, and accountability.

---

[1] If you need help with your assignment, please contact:

- the academic teaching staff in your unit for guidance in understanding or completing this type of assessment
- the Writing Centre for academic skills support.

[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

Lectures

A 2 hour Lecture would be delivered each week on campus. Students are highly encouraged to ask questions from the Lecturer(s) in a bid to clarify anything they might not be sure of. Students are also encouraged to engage in active discussion via the General Discussion Forum on iLearn.

Lecture Notes (Slide Decks) would be made available, however, they are not a substitute of the recommended Readings. Please note that Digital Recordings of the Lectures would be available via the Macquarie University's Echo360 Active Learning Platform.

Workshops

The workshops aim to soliidify the concepts discussed in the lectures by engaging students in hands-on and problem solving exercises.Students have the opportunity to practice their networking skills under the guidance of a demonstrator. There will be one

2-hour workshop session each week, starting in week **2** and each workshop exercise is worth **2** marks with an overall weighting of **10%.** These sessions are conducted in a specially-equipped networking laboratory. There is no opportunity to conduct workshops outside of the assigned sessions.Weeks **12** and **13** are catchup weeks and provide an opportunity to do any workshop exercise(s) that were missed over the course of the semester (weeks 2-11). Each week, students receive exercises to work on. Keeping up with these exercises is crucial, as it aids in understanding the unit's content and prepares students for assignments.

It's important to note that while workshops are structured in alignment with lecture content, there may not always be direct one-to-one correspondence. This is due to the necessity for workshops allowing students to familiarize themselves with new tools and devices. As a result, there are limitations on available time slots for experimenting with technologies discussed in certain lectures.

Please note that catch-up classes are intended for students who have missed a few labs due to genuine reasons. Special consideration approval is required for students who have missed more than two labs, up to a maximum of four labs. Students who have failed to attend any lab class during the semester are not allowed to use these sessions to make up for missed work.

Note: Workshops commence in Week 2.

Assignments

Assignments would be made available on iLearn and would submitted online via Turnitin**.**

Assignment 1-Problem Solving: The problem-solving assignment serves the purpose of familiarizing students with addressing real-world problems or issues. Its design is intended to guide students in analyzing specific problems and identifying optimal solutions. This assignment aims to enhance the students' ability to apply theoretical knowledge to real-world scenarios. Certain questions may necessitate thorough research, and arriving at an acceptable and reasonable answer will be a step-by-step process.

Assignment 2-Group based Assignment: In this assignment, students are expected to apply their understanding of mobile and wireless communication to conduct in-depth research and perform a critical analysis of pertinent literature within this field. They are then required to present their findings and conclusions. Furthermore, this assessment provides a valuable context for students to apply project management principles and tools, ensuring effective coordination, planning, and execution of their group project. This experience offers an opportunity for students to enhance their collaborative skills, professional communication, and the practical application of project management concepts.

Although this assignment is a group effort, it's important to emphasize that individual accountability remains a crucial aspect. Each team member is responsible for their own contributions and work within the group context.

Quizzes

There are two quizzes scheduled during the semester. Each quiz carries a weightage of 20%. These quizzes, short tests in nature, will draw upon your prior attempts at discussion questions

and the content covered in previous lectures. They will be conducted online via iLearn during your workshop session, with the questions provided at the start of the session. The duration of each quiz will be 1 hour.

Recommended Text

It should be noted that no single Textbook addresses all Topics of this Unit. Accordingly, a large proportion of the Lecture Notes are drawn from the Research Papers, White Papers, and Standards' Documents. Students are, therefore, encouraged to read the recommended Reading List to gain a solid understanding of the Topics. Nevertheless, some suggested Books include:

Computer Networks and Internets, Global Edition, Sixth Edition (Author : Douglas E. Comer)

Computer Networking : A Top-Down Approach, Global Edition, Eight Edition (Authors : James F. Kurose and Keith W. Ross)

Internetworking with TCP / IP : Principles, Protocols, and Architecture – Volume 1, Sixth Edition (Author : Douglas E. Comer)

Information Technology Project Management, 9th Edition, Kathy Schwalbe, ISBN-13: 978-1-337-10135-6

Methods of Communication

We will communicate with you via your Macquarie University's Email or through Announcements on iLearn. Queries to Convenor can either be placed on the iLearn Discussion Board or sent to the teaching staff from your University Email Address.

COVID Information

For the latest information on the University’s response to COVID-19, please refer to the Coronavirus infection page on the Macquarie University's website, https://www.mq.edu.au/about/coronavirus-faqs. Remember to check this page regularly in case the information and requirements change during the Semester. If there are any changes to this Unit in relation to COVID, these will be communicated via iLearn.

Unit Schedule

Week #	Lecture / Activity	Assessment Task
Week 1	Unit Introduction, IT Project Management	
Week 2	Classless Inter Domain Routing	
Week 3	Internet Routing Architectures	
Week 4	Border Gateway Protocol – Part I	
Week 5	Border Gateway Protocol – Part II	Assignment 2: Intermediate PM Plan Due.

Week 6	Multiprotocol Label Switching	Quiz 1
Week 7	Network Security Part I: Virtual Private Networks	Assignment 1 – Due
Week 8	Network Security – Part II,	
Week 9	MPLS VPN	
Week 10	Transport Layer Protocol Design	Quiz 2
Week 11	The Future of Networking	Assignment 2 and PM Supplementary reports are due.
Week 12	Group Presentations	
Week 13	Group Presentation	

Policies and Procedures

Macquarie University policies and procedures are accessible from Policy Central (https://policies.mq.edu.au). 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
- Assessment Procedure
- Complaints Resolution Procedure for Students and Members of the Public
- Special Consideration Policy

Students seeking more policy resources can visit Student Policies (https://students.mq.edu.au/support/study/policies). It is your one-stop-shop for the key policies you need to know about throughout your undergraduate student journey.

To find other policies relating to Teaching and Learning, visit Policy Central (https://policies.mq.edu.au) and use the search tool.

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: https://students.mq.edu.au/admin/other-resources/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 contact globalmba.support@mq.edu.au

Academic Integrity

At Macquarie, we believe academic integrity – honesty, respect, trust, responsibility, fairness and courage – is at the core of learning, teaching and research. We recognise that meeting the expectations required to complete your assessments can be challenging. So, we offer you a range of resources and services to help you reach your potential, including free online writing and maths support, academic skills development and wellbeing consultations.

Student Support

Macquarie University provides a range of support services for students. For details, visit http://students.mq.edu.au/support/

The Writing Centre

The Writing Centre provides resources to develop your English language proficiency, academic writing, and communication skills.

- Workshops
- Chat with a WriteWISE peer writing leader
- Access StudyWISE
- Upload an assignment to Studiosity
- Complete the Academic Integrity Module

The Library provides online and face to face support to help you find and use relevant information resources.

- Subject and Research Guides
- Ask a Librarian

Student Services and Support

Macquarie University offers a range of Student Support Services including:

- IT Support
- Accessibility and disability support with study
- Mental health support
- Safety support to respond to bullying, harassment, sexual harassment and sexual assault

- Social support including information about finances, tenancy and legal issues
- Student Advocacy provides independent advice on MQ policies, procedures, and processes

Student Enquiries

Got a question? Ask us via AskMQ, or contact Service Connect.

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.

Changes from Previous Offering

The project management component has been incorporated into the unit through assessments, accompanied by a lecture on project management.

Workshop exercises will be assessed and and workshop carries a weighting of 10%.

The unit no longer includes a final exam.

Standards and 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.

Note: There are no hurdles in this unit.

Concretely, **in order to pass the unit**, you must obtain an overall total mark of **50%** or higher.

Students obtaining a higher grade than a pass in this unit will (in addition to the above)

- ◦ have a total mark of **85%** or higher to obtain High Distinction;
  ◦ have a total mark of **75%** or higher to obtain Distinction;
  ◦ have a total mark of **65%** or higher to obtain Credit.

Note:

You are encouraged to:

- set your personal deadline earlier than the actual one;
- keep backups of all important assessed tasks;.
- make sure no one else picks up your printouts.

All work submitted should be readable and well presented.

You should never commit plagiarism in any of your submitted work, including practical answers.

Unit information based on version 2024.02 of the Handbook