COMP8250

Advanced Topics in Computer Networks

Session 1, In person-scheduled-weekday, North Ryde 2022

School of Computing

Contents

General Information

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Credit points
10

Prerequisites
ITEC647 or COMP6250

Corequisites

Co-badged status
COMP7250

Unit description
This unit aims to address various advanced aspects of networking, particularly the current and emerging research topics in network. The focus will be on material drawn from the recent research literature. Topics include but are not limited to label switching, VPN architectures, Inter-domain routing, advanced multicast routing models, traffic engineering, congestion control, quality of service, and multimedia networks. The unit consists of lecture, reading, discussion and assignment components.

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: Demonstrate working knowledge of the key networking technologies and their interaction.

ULO2: Analyse and Design Internet Routing Architectures and demonstrate working knowledge of emerging routing paradigms through peering for large loosely connected networks.

ULO3: Design simulation and experiments to demonstrate the working of network technologies and algorithms.

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

Late submissions **will not be accepted** without an approved Special Consideration request. Assessments submitted after the due date will receive a mark of **zero**.

Assessment Tasks

Name	Weighting	Hurdle	Due
Assignment 1	20%	No	Week 7
Assignment 2	40%	No	Week 11
Final Examination	40%	No	TBA

Assignment 1

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

The purpose of the problem solving assignment is to help the students to get accustomed to dealing with real world problem situations/issues.It is designed to help students analyse a particular problem and find its best solution. Some questions may require an in depth research and will be a process to come up with an acceptable and reasonable answer

On successful completion you will be able to:

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- Analyse and Design Internet Routing Architectures and demonstrate working knowledge of emerging routing paradigms through peering for large loosely connected networks.

Assignment 2

Assessment Type [1]: Project
Indicative Time on Task [2]: 40 hours
Due: **Week 11**
Weighting: **40%**

Assignment 2 - Group Project will apply to all material taught in this course. Students will leverage their knowledge of mobile networks to research and critically analyse relevant literature in the discipline and present conclusions. The assessment also allows students to further develop their team working and professional communication skills.

On successful completion you will be able to:

- Demonstrate working knowledge of the key networking technologies and their interaction.
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- Design simulation and experiments to demonstrate the working of network technologies and algorithms.
- 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.

Final Examination

Assessment Type [1]: Examination
Indicative Time on Task [2]: 20 hours
Due: **TBA**
Weighting: **40%**

Written exam.

On successful completion you will be able to:

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[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

2 hours of pre-recorded lectures each week.

Lectures are used to introduce communication protocols, ISP network architecture and design and put them in a wider context. You are encouraged to ask questions of the lecturer, both during and outside the lecture, to clarify anything you might not be sure of.

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.

It should be noted that no single text book completely covers the content of this unit. A large portion of the lecture material is drawn from research papers, white papers and standard documents . Students are encouraged to read the weekly recommended reading list to gain a solid understanding of the topics that are covered.

Assignments

Your assignment is to be submitted online using **Turnitin**.

Tutorial

Tutorials are posted every Friday on ilearn. Even though these tutorial exercises are not formally assessed, it is important that students solve them on a weekly basis as these questions are often previous exam questions or structured like test/exam questions. The more practice you have at such questions, the more likely you are to do yourself justice in exams. Solutions to these exercises will be regularly posted on ilearn unit site. If need be, this will also allow you to discuss the problems effectively with your lecturer/peers and maximise the feedback you get on your work. In case of any difficulty, seek help from the teaching staff.

Practicals

The purpose of practical classes is to reinforce the concepts that are covered in the lecture materials.

Practical classes give you an opportunity to practice your practical networking skills under the supervision of a demonstrator. Each week you will be given a number of problems to work on; it is important that you keep up with these problems as doing so will help you understand the material in the unit and prepare you for the work in assignments.

***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.

There will be one **2** hour practical session each week, Conducted in a specially-equipped networking laboratory. There is no opportunity to conduct practical work outside the assigned sessions.

Note that practical classes will start in week 2.

General Notes

In this unit, you should do the following:

- Attend lectures, take notes, ask questions.
- Attend your tutorial, seek feedback from your lecturer on your work.
- Prepare for and strive to do well in the quizzes
- Read appropriate sections of the text, add to your notes and prepare questions for your lecturer/tutor.
- Prepare answers to tutorial questions.
- Work on any assignments that have been released.

Please note it is to your benefit to attend most of the classes, prepared to participate in discussions, ask and answer questions, and provide perspectives from your own background and workplaces. Resources to assist your learning Digital recordings of lectures are available as

Echo360 through iLearn login. These are provided for review material and in case of missing lectures. Recordings should not be relied upon and copyrighted material may be omitted. iLearn is used for out-of-class communication as well as forums where active discussion of issues is encouraged. iLearn can be found at can be found at http://learn.mq.edu.au. You are encouraged to review iLearn weekly and to do background reading before each class.

TEXT

There is no single text book containing material that could address all topics of unit. All necessary reading material will be provided by the lecturer every week.

Other Useful Books (You need not buy unless you believe you need to own one)

Computer Networks and Internets: Global (6th) Edition by Douglas Comer

Computer Networking: A Top-Down Approach 7th edition by James F. Kurose and Keith W. Ross

Douglas Comer, Internetworking with TCP/IP volume 1: Principles Protocols, and Architecture, 6th edition, Prentice Hall.

Unit Schedule

Tentative Schedule		
Week 1	Unit Introduction, Introduction to Networks- Overview of Addressing: CIDR and Routing (Intra-Domain)	
Week 2	Border Gateway Protocol Part I	
Week 3	Border gateway Protocol Part II	
Week 4	Internet Routing Architectures	
Week 5	IP Multicast	
Week 6	Multi-Protocol label Switching (MPLS)	
Week 7	VPN Technology: MPLS VPN, other approaches to designing VPNs, VPLS	Assignment 1 Due
Break		
Week 8	Software Defined Networking	
Week 9	Satellite Networks	
Week 10	Network Security	

Week 11	Group Presentations	Group Reports Due
Week 12	Group Presentations	
Week 13	Unit Review	

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 an

d 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 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

- Adjusted unit schedule to include new topics
- Added late submission policy to general assessment information

Standards and Grading

Standards and Grading

Grades

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.

There are no hurdles in the 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 tutorial and practical answers.