COMP9332 Network Routing & Switching

UNSW

SUBJECT OUTLINE - Term 2, 2019

UOC: 6

Pre-requisites: COMP9331/3331 or any other introductory course on networking (students should have some basic understanding of TCP/IP networking architecture and protocols as well as some basic programming knowledge)

Description:

This course will focus on the routing and switching architectures, algorithms, and protocols for packet switching networks with an emphasis on the Internet or Internet Protocol (IP) based networks. Routing techniques for both traditional wired networks, and the emerging wireless and mobile networks will be examined. The course will teach the fundamental routing concepts using open standards, such as BGP and OSPF. Configuring vendor specific products is outside the scope of this course.

Learning Objectives:

1. gain good understanding of the role of routing and switching in modern communication networks;

2. master routing architectures, protocols, and algorithms with an emphasis on fundamental concepts and principles;

3. learn how to configure, tune, and analyse the performance of popular routing protocols;

4. develop abilities to innovate routing solutions for new networking requirements.

Teaching Strategies:

There will be two 2-hour lectures per week. In addition to lectures, there will be three 1-hour optional consultation slots each week. During these consulting hours, students having difficulty may seek further help on first come first serve basis. Students are also required to attend routing laboratory sessions of 4 hours per week for 6 weeks (weeks 3 - 8; week-8 will be devoted to lab test). During lab hours of week 9, students will be asked to solve advanced tutorial problem. All students are asked to register for the labs on-line.

Parallel Teaching - Some advanced undergraduate students are allowed to enrol in this course. Some assessment components for undergraduate students may be different from the postgraduate assessments.

Assessment

There will be 4 assessment components each addressing a different subset of the learning objectives.

- A multiple choice test (closed book) in the middle of the semester (week 6 or 08 July) to assess learning objectives 1 and 2.
- One assignment due near the end of the semester to assess learning objective 4.
- A laboratory test in Week 8 assessing learning objective 3.
- An open-book final examination will be held at the end of semester assessing learning objectives 1, 2, and 4.

The weighting and due date of each assessment component are shown in the following Table.

Item	***Weighting***	Due
Mid-Session Test	15%	Week 6 (lecture time)
Lab Exam	10%	Week 8 (lab time)
Assignment	25%	Week 10 (lecture time)
Final Exam	50%	End of Sem

There is no supplementary for mid-session and lab tests. If you miss any or both of these tests due to unavoidable reasons, you may be able to transfer their weigting to the final exam. For late submission of the assignment, 10% of the awarded marks will be deducted for each late day. No assignments will be accepted after one week of the original due date.

Overall and Final Assessment

Minimum requirements for obtaining a Pass grade or better are: a mark of 20 out of 50 (i.e. 40%) in the Final, *and* an overall grade of at least 50%. If you cannot clear the bar in the final exam (i.e. you get less than 40% in the final exam), the maximum final mark that will be reported is 40%.

Under special circumstances, the LIC reserves the right to scale marks up or down.

Student Conduct

Copying assignments is unacceptable. Assignments will be checked. The penalties for copying range from receiving no marks for the assignment, through receiving a mark of 00 FL for the course, to expulsion from UNSW (for repeat offenders). Allowing someone to copy your work counts as plagiarism, even if you can prove that it is your work.

The **Student Code of Conduct** (Information, Policy) sets out what the University expects from students as members of the UNSW community. As well as the learning, teaching and research environment, the University aims to provide an environment that enables students to achieve their full potential and to provide an experience consistent with the University's values and guiding principles. A condition of enrolment is that students *inform themselves* of the University's rules and policies affecting them, and conduct themselves accordingly.

In particular, students have the responsibility to observe standards of equity and respect in dealing with every member of the University community. This applies

to all activities on UNSW premises and all external activities related to study and research. This includes behaviour in person as well as behaviour on social media, for example Facebook groups set up for the purpose of discussing UNSW courses or course work. Behaviour that is considered in breach of the Student Code Policy as discriminatory, sexually inappropriate, bullying, harassing, invading another's privacy or causing any person to fear for their personal safety is serious misconduct and can lead to severe penalties, including suspension or exclusion from UNSW.

If you have any concerns, you may raise them with your lecturer, or approach the School Ethics Officer, Grievance Officer, or one of the student representatives.

Plagiarism is defined as using the words or ideas of others and presenting them as your own. UNSW and CSE treat plagiarism as academic misconduct, which means that it carries penalties as severe as being excluded from further study at UNSW. There are several on-line sources to help you understand what plagiarism is and how it is dealt with at UNSW:

- Plagiarism and Academic Integrity
- UNSW Plagiarism Procedure

Make sure that you read and understand these. Ignorance is not accepted as an excuse for plagiarism. In particular, you are also responsible that your assignment files are not accessible by anyone but you by setting the correct permissions in your CSE directory and code repository, if using. Note also that plagiarism includes paying or asking another person to do a piece of work for you and then submitting it as your own work.

UNSW has an ongoing commitment to fostering a culture of learning informed by academic integrity. All UNSW staff and students have a responsibility to adhere to this principle of academic integrity. Plagiarism undermines academic integrity and is not tolerated at UNSW. Plagiarism at UNSW is defined as using the words or ideas of others and passing them off as your own.

If you haven't done so yet, please take the time to read the full text of

- UNSW's policy regarding academic honesty and plagiarism

The pages below describe the policies and procedures in more detail:

- Student Code Policy
- Student Misconduct Procedure
- Plagiarism Policy Statement
- Plagiarism Procedure

You should also read the following page which describes your rights and responsibilities in the CSE context:

- Essential Advice for CSE Students

Continual Course Improvement

Student feedback on this course, and on the lecturing in this course, will be gathered via questionnaires held at or after the end of the course. Student feedback is taken seriously, and continual improvements are made to the course based in part on this feedback. The course questionnaire results go to the Head of the School of Computer Science and Engineering, who reads the results and follows up in cases where action is clearly needed.

Special Consideration

If your work in this course is affected by unforeseen adverse circumstances, you should apply for Special Consideration. If your request is reasonable and your work has clearly been impacted, then

- for an assignment, you may be granted an extension
- for the Final Exam, you may be offered a Supplementary Exam

Note the use of the word "may". None of the above is guaranteed. It depends on you making a convincing case that the circumstances have clearly impacted your ability to work.

UNSW handles special consideration requests centrally (in the Student Lifecycle division), so all special consideration requests must be submitted via the UNSW Special Consideration website.

Special consideration requests must be accompanied by documentation, which will be verified by Student Lifecycle. Do not email the course convenor directly about special consideration.

If you cannot attend the Final Exam because of illness or misadventure, then you must submit a Special Consideration request, with documentation, through MyUNSW within 24 hours of the exam. If your request is reasonable, then you will be awarded a Supplementary Exam.

Note that UNSW expects you to be available to sit Supplementary Exams (held in the week Sep 9-13) if required. If you are awarded a Supplementary Exam and do not attend, then your exam mark will be zero.

For further details on special consideration, see the UNSW Student website .

If you are registered with Disability Services, please forward your documentation to **Course Convenor** within the first two weeks of term.

There is no prescribed textbook for this course.

References

- TCP/IP Protocol Suite, Behrouz Forouzan, McGraw Hill, 3rd Edition, 2006.
- Adolf Rodriguez et al, TCP/IP Tutorial and Technical Overview, IBM Redbooks
- P. Goransson, C. Black, and T. Culver. (2017) Software Defined Networks: A Comprehensive Approach,(2nd Edition). Morgan Kaufmann.
- Computer Networking (4th, 5th or 6th Edition), Kurose and Ross
- Internetworking with TCP/IP Principles, Protocols, and Architectures, Fourth Edition, By Douglas Comer, Prentice Hall, 2000

The course may make use of some freely available materials such as IETF RFCs, published articles (journal, magazine, or conference), and industry white papers. Details of any such material will be provided during the lectures.

Lecturer in Charge (LIC)

Dr. Wen Hu, Room 606 (Bldg K17) email: wen.hu at unsw.edu.au

Lecture: 6-8pm Monday Central Lecture Block 5, and 6-8pm Thursday Central Lecture Block 3.

Consultation Hours: Mondays 3:30-4:30pm, Room K17-606.
Note: Consultation hours are subject to change. Any changes will be announced on course website.

Course Syllabus and Schedule:: The following topics will be covered in 9 weeks (there may be minor variations): IPv4 addressing fundamentals, NAT, IPv6, RIP, BGP, OSPF, Multicasting, Software Defined Networking, MANET (mobile adhoc network) Routing, Geographic Routing, Geocasting, DTN (delay tolerant network) Routing, and VPN (virtual private network).

Outcomes from previous course evaluation:: In 18s1, about 90% of the students agreed that they were satisfied with the quality of the course with a mean value of 4.82 out of 6 in myExperience survey.
