Computer Network Design - Course Outline
NWEN 302: 2013 Trimester 2

This document sets out the workload and assessment requirements for NWEN 302. It also provides contact information for staff involved in the course. If the contents of this document are altered during the course, you will be advised of the change by an announcement in lectures and/or on the course web site. A printed copy of this document is held in the School Office.

This course addresses the principles, architectures and protocols that have shaped the development of the Internet and modern networked applications. It examines network design principles, underlying protocols, technologies and architectures of the TCP/IP protocol stack. The design of various protocols in the stack, such as, protocols like ARP, ICMP, IP, DHCP, TCP, UDP, routing protocols like OSPF, and IPv6 will be covered in detail, together with logical link control, medium access control and physical media communications issues.

Objectives

By the end of the course, students should be able to:
1. Explain the process in which packets are delivered from source to destination in the Internet (GA 3(b))
2. Explain key routing algorithms, the process of how routing protocols communicate/exchange topology information and set up routing tables (GA 3(a), 3(b), 3(d), 3(e))
3. Explain the operation of the TCP flow and congestion control algorithms (GA 3(a), 3(b), 3(c), 3(d), 3(e))
4. Explain the role of medium access control and implications of different types of physical layers (GA 3(a), 3(b), 3(c), 3(d), 3(e))
5. Setup and interconnect networks with a emulation tool (GA 3(b), 3(d), 3(f))
6. Implement a simple packet sniffer to analyze data packets on the network (GA 3(b), 3(d), 3(f))
7. Implement simple networking and routing algorithms using TCP/IP primitives (GA 3(b), 3(d), 3(f)).

Textbook and recommended reference

The textbook for NWEN 302 is:
* James F. Kurose and Keith W. Ross, *Computer Networking: A Top-Down Approach*, Sixth Edition, Pearson, available from VicBooks.

Good reference books are:
* Ying-Dar Lin, Ren-Hung Hwang and Fred Baker, *Computer Networks: An open source approach*, McGraw-Hill, 2011, available in the library.
* Computer Networking : Principles, Protocols and Practice, Olivier Bonaventure, Universite catholique de Louvain, available online.

Supplementary reference texts for network performance modelling are:
* Alberto Leon-Garcia, *Probability and Random Processes for Electrical Engineering* (2nd ed), Prentice-Hall, 1994.
* S.K. Bose, *An Introduction to Queueing Systems*, Kluwer, 2002.
* L. Kleinrock, *Queueing Systems Volume 1:Theory*, Wiley, 1975.
* D. Bertsekas and R. Gallager, *Data Networks*, Prentice-Hall, 1992. (available free online from author's homepage)

Lectures, Tutorials, Laboratories, and Practical work

A schedule of lecture topics, readings, and assignment due dates is available online

* Lectures for NWEN 302 are: Mon/Thu/Fri 13:10-14:00 in MYLT101.
* There will be weekly 3hr labs: Mon 14:00-17:00 or Fri 14:00-17:00 in CO246 (there are two 3hr timeslots; the list of students who have signed up is here.

Assignments and Labs

There will be 4 lab projects, 2 set in weeks 1-6 and 2 set in weeks 7-12.

There will also be 4 homework assignments, 2 set in weeks 1-6 and 2 set in weeks 7-12.

All assignments/labs are due 3 weeks from the date they are handed out.

Workload

In order to maintain satisfactory progress in NWEN 302, you should plan to spend at least 10 hours per week on this paper. A plausible and approximate breakdown for these hours would be:

- Lectures: 3 hours
- Readings: 2 hours
- Assignments: 2 hours
- Labs: 3-4 hours

School of Engineering and Computer Science

The School office is located on level three of the Cotton Building (Cotton 358).

Staff

The course organiser for NWEN 302 is Prof Winston Seah. The lecturers for the course are Prof Winston Seah and Andy Linton. Their contact details are:

- Prof Winston Seah
- Cotton 336
- +64 4 463 5233 x 8493
- winston.seah@ecs.vuw.ac.nz

- Andy Linton
- Cotton 331
- +64 4 463 9792
- Andy.Linton@ecs.vuw.ac.nz

Tutors:
- *Assignments, Labs 1 and 2*
- James McVay
- James.McVay@ecs.vuw.ac.nz

- *Labs 3 and 4*
- Mark Walker
- Mark.Walker@ecs.vuw.ac.nz

Lab advisor:
- Radek Hes
- Cotton 360
- +64 4 463 6496
- radek.hes@ecs.vuw.ac.nz

Announcements and Communication

The main means of communication outside of lectures will be the NWEN 302 web area at http://ecs.victoria.ac.nz/Courses/NWEN302_2013T2/. There you will find, among other things, this document, the lecture schedule and assignment handouts, and the NWEN 302 Forum. The forum is a web-based bulletin board system. Questions and comments can be posted to the forum, and staff will read these posts and frequently respond to them.

Assessment

Your grade for NWEN 302 will be determined based on the following assessment weightings:

Item	Weight	Due
Assignment 1	2.5%	16 August 2013 (Friday)
Assignment 2	2.5%	9 September 2013 (Monday)
Assignment 3	2.5%	9 October 2013 (Wednesday)
Assignment 4	2.5%	20 October 2013 (Sunday)
Lab 1	10%	9 August 2013 (Friday)

Lab 2	10%	30 August 2013 (Friday)
Lab 3	10%	27 September 2013 (Friday)
Lab 4	10%	18 October 2013 (Friday)
Final Examination	50%	30 October 2013 (Wednesday)

Exam

The underlined timetable for final examinations will be available from the University web site and will be posted on a notice board outside the faculty office. The final examination will be three hours long. No computers, electronic calculators or similar device will be allowed in the final examination. Paper non-English to English dictionaries will be permitted. The examination period for trimester 2 is 25 October - 16 November.

Policies and Penalties for late Submission

All assignments are to be submitted electronically (in PDF format) via the ECS submission system and are due at 23:59 on the date specified. The penalty for late submissions will be a deduction of 20% of the marks per day late (00:00 the following day is counted as one day late).

All projects are to be submitted electronically via the ECS submission system and are due at 23:59 on the date specified. A project is penalised at 10% per day late (00:00 the following day is counted as one day late). After 5 days, projects will no longer be accepted for marking.

Any request for extension must be supported by a medical certificate or other acceptable documentation for non medical reasons. Medical certificates must be provided by a registered medical practitioner.

Plagiarism

Working Together and Plagiarism

We encourage you to discuss the principles of the course and assignments with other students, to help and seek help with programming details, problems involving the lab machines. However, any work you hand in must be your own work.

The School policy on Plagiarism (claiming other people's work as your own) is available from the course home page. Please read it. We will penalise anyone we find plagiarising, whether from students currently doing the course, or from other sources. Students who knowingly allow other students to copy their work may also be penalised. If you have had help from someone else (other than a tutor), it is always safe to state the help that you got. For example, if you had help from someone else in writing a component of your code, it is not plagiarism as long as you state (eg, as a comment in the code) who helped you in writing the method.

Mandatory Requirements

1. Obtain at least 40% of the total available marks across all the labs;
2. Obtain a D grade or better in the final exam.

Passing NWEN 302

To pass NWEN 302, a student must satisfy mandatory requirements and gain at least a **C** grade overall.

Withdrawal

The last date for withdrawal from NWEN 302 with entitlement to a refund of tuition fees is Friday 26 July 2013. The last date for withdrawal without being regarded as having failed the course is Friday 27 September 2013 -- though later withdrawals may be approved by the Dean in special circumstances.

Rules & Policies

Find key dates, explanations of grades and other useful information at http://www.victoria.ac.nz/home/study.

Find out about academic progress and restricted enrolment at http://www.victoria.ac.nz/home/study/academic-progress.

The University's statutes and policies are available at http://www.victoria.ac.nz/home/about/policy, except qualification statutes, which are available via the Calendar webpage at http://www.victoria.ac.nz/home/study/calendar (See Section C).

Further information about the University's academic processes can be found on the website of the Assistant Vice-Chancellor (Academic) at http://www.victoria.ac.nz/home/about/avcacademic

All students are expected to be familiar with the following regulations and policies, which are available from the school web site:

Grievances

Student and Staff Conduct
Meeting the Needs of Students with Disabilities
Student Support
Academic Integrity and Plagiarism
Dates and Deadlines including Withdrawal dates
School Laboratory Hours and Rules
Printing Allocations
Expectations of Students in ECS courses

The School of Engineering and Computer Science strives to anticipate all problems associated with its courses, laboratories and equipment. We hope you will find that your courses meet your expectations of a quality learning experience.

If you think we have overlooked something or would like to make a suggestion feel free to talk to your course organiser or lecturer.

Course Outline as PDF