Internet Engineering - Course Outline

NWEN 402: 2015 Trimester 2

This document sets out the workload and assessment requirements for NWEN 402. 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.

Contents of this document:

Course Organisation

Staff

The course coordinator for NWEN 402 is Ian Welch. The lecturers for the course are Qiang Fu and Bryan Ng. Their contact details are:

- Ian Welch
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- Bryan Ng
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The Class Rep for NWEN 402 will be elected during the first week of the course.

Class/lab Times and Room Numbers

The timetabling for this course will change after the first six weeks of the course reflecting a change in lecturer and a change from a more lecture-based focus to an applied focus in terms of course delivery.

Throughout the course, lectures and seminars for NWEN 402 are on Wednesdays and Thursdays from 1200-1250 in room New Kirk 106.

Lab time is scheduled on Fridays 10-noon in CO246. Supervised labs will be run from time to time and the lab is available for project work when supervised labs are not scheduled.

Trimester Dates and Examination Period Dates

NWEN 402 is a trimester 2 course. The trimester starts on Monday 13th July.

The examination period at the end of the course is 23 October - 14 November,

Objectives and Content

The Course

This course addresses the use of important technologies in the design and engineering of modern high performance Internet applications and infrastructure. Course coverage includes views on the impact of economic, political and technical issues on internet engineering which are explored through case studies and recent professional and research literature. These aspects are explored through practical work in distributed systems/Internet technology plus lectures and seminars.

Learning Objectives

NWEN 402 is designed to:

- Investigate the science and technology of networking in real systems, in particular, the Internet;
- Provide insight into aspects of real-world projects such as scalability, reliability/availability and economics; and
- Provide an overview of emerging and new aspects of Internet technology.

By the end of the course, students should:

1. Know the real world issues involved in the deployment and operation of IP networks. (BE graduate attribute 3(d), 3(e))
2. Be able to design, implement and configure fundamental IP networks, network devices, and network services. (BE graduate attribute 3(a), 3(b), 3(c))
3. Be aware of standardization efforts and research pursued by academia and industry. (BE graduate attribute 3(d), 3(e))

The assignments, labs, lectures and seminars will contribute to all learning objectives.

Note: NWEN 402 is part of the Engineering program at Victoria University of Wellington. BE students are expected to exhibit a number of graduate attributes upon graduation. These course objectives contribute to the graduate attributes as indicated above. A full table of these attributes is available at Graduate Attributes.

Course Content, Delivery and Workload

A schedule of lecture topics, readings, and assessment due dates is available online. Topics covered will include:

1. Overview of the Internet and its structure.
2. Key internetworking protocols such as BGP, DNSSec etc.
3. Use of protocols to architect reliable and secure enterprise networks
4. Network measurement techniques at Internet scale
5. New paradigms such as network virtualisation and decentralized versus centralized control.

During the second half of the course there will be a focus on using Software Defined Networking to explore many of the topics above.

Attendance at lectures and the laboratories are an essential part of the learning process.

In addition to attending lectures and tutorials, we expect you to spend at least two hours a week preparing for them by doing assigned readings.

These can be found in the Schedule.

In order to maintain satisfactory progress in NWEN 402, you should plan to spend an average of at least *10* hours per week on this paper. A plausible and approximate breakdown for these hours would be:

- Lectures and labs: 2-4 hours
- Readings: 2 hours
- Assignment and project work: 6 hours

Readings

There is no specific textbook for NWEN 402. The materials covered in the course can be found in the following recommended references, along with any other publications, notes or materials required. Most (if not all) of the publications will be available online through the VUW Library website or made available on the course website for students to download.

Recommended references:

- Douglas E. Comer, *Computer Networks and Internets*, 5th Edition, Pearson International Edition, 2009. -- this book covers the fundamental topics as well as advanced topics discussed in this course
- William Stallings, *High-Speed Networks - TCP/IP and ATM Design Principles*, Prentice Hall, 1997.
- Ying-Dar Lin, Ren-Hung Hwang and Fred Baker, *Computer Networks - An Open Source Approach*, McGraw Hill, 2012.

Materials and Equipment

We will usually hand out copies of the lecture slides, though we cannot guarantee to always have them ready for the lecture. All the course handouts will be available on the course web site.

The laboratory and project work will require the use of the School's lab computers. If you have access to a computer outside the labs, you may use it to work on these but you will need to acquire your own software for implementing Software Defined Networking and a simulator for running the software.

Please note that we do not have the resources to provide assistance if you have difficulties with a computer at home -- the tutors can only answer questions about the assignments/projects and the workstations in the laboratories. Note also that we cannot offer you any help with choosing, setting up, or fixing your own computer system, other than the general advice that we provide on the website.

Assessment

Method of Assessment

There will be two assignments, two tests and a substantial lab project.

Assignments

The assignments will be based upon discussions during scheduled seminars. Students will write up a structured description of what was discussed and submit this for marking.

Projects

The lab project will focus on implementing Software Defined network infrastructure and you will do some of this work during the scheduled laboratory time as well as during your own time outside of class. You will be developing software, evaluating it and writing a report.

There are four deliverables: (1) initial setup (done in a supervised lab) and documentation of setup of tools; (2) project proposal setting out the goals of the project and how they will be achieved, delivered as a presentation assessed on the content; (3) status update before the end of the trimester, delivered as a presentation, assessed on quality of design and progress so far; (4) a final report submitted towards the end of the examination period, assessed upon the quality of your work in terms of development, evaluation and communication of these aspects.

Tests

There will be two tests.

Test one The first test will be **one hour long** and is a closed book written test covering the first five weeks of the course. It will take place in lecture time on 20th August.

Should you miss the test you must contact the responsible lecturer Qiang Fu as soon as possible via email or via his work phone number.

Test two The second test is a take-home test that you will have approximately a week to complete. We will let you know

the exact date closer to the time and will coordinate the date with other 400-level courses to try and avoid bottlenecks. The second test will cover the second half of the course.

You should contact the course coordinator as soon as practical if your personal circumstances make attendance particularly difficult.

Final Examination

This course in internally assessed, there is no final examination.

Weightings of Each Assessment Task

Your grade for NWEN 402 will be determined based on the following assessment weightings:

Item	Weight
Two assignments @ 10% each	20%
Test one	15%
Test two	15%
Project - getting started	5%
Project - proposal	10%
Project - progress update	15%
Project - project report	20%

Note: Bachelor of Engineering students should be aware that copies of their assessed work may be retained for inspection by accreditation panel.

Due Dates

The hand-in dates for the assignments and projects are:

Item	Due date
Project setup documentation	Monday 3rd August @ 23:59
Assignment 1	Friday 7th August @ 23:59
Project proposal presentation	Wednesday and Thursday 12th and 13th August during class
Test one	Thursday 20th August
Assignment 2	Monday 21st September @ 23:59
Test two	TBD week of 12th October
Project status update presentation	Wednesday and Thursday 14th and 15th October during class
Project final report	2nd November @ 23:59

Assignments and projects should be submitted via the online submission system. In general, you should submit your assignments as a PDF document and the projects will require you to submit the program code, any test data and results and the project report (PDF as well).

Penalties

All students must adhere strictly to the deadlines for submission of assignments; a medical certificate is required in the case of late work due to illness.

Penalties for late submission of assignments it will be as follows: for each day late, 10% of the final grade will be deducted; e.g. if the assignment is submitted 3 days after the deadline, 60% of the final grade will be deducted.

Penalties for late submission of final project report; for each day late, 20% of the final grade will be deducted; e.g. if the project report is submitted 3 days after the deadline, 60% of the final grade will be deducted.

Duration of Examination

There is no examination.

Special Requirements

This course has no special requirements.

Mandatory Requirements

The mandatory requirements are that you:

- achieve a "D" in both terms tests.
- achieve a "D" in both assignments.
- achieve a "D" overall across all phases of the project.

Passing NWEN 402

To pass NWEN 402, a student must satisfy mandatory requirements and gain at least a **C-** grade overall.

Additional Information

Announcements and Communication

The main means of communication outside of lectures will be the NWEN 402 web area at http://ecs.victoria.ac.nz/Courses/NWEN402_2015T2/. There you will find, among other things, this document, the lecture schedule and assignment handouts, and the NWEN 402 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.

University Requirements and Plagarism Statement

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.

Withdrawal

The last date for withdrawal from NWEN 402 with entitlement to a refund of tuition fees is Friday 24 July 2015. The last date for withdrawal without being regarded as having failed the course is Friday 25 September 2015 -- 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