

Advanced Network Applications - Course Outline

NWEN 304: 2011 Trimester 1

This document sets out the workload and assessment requirements for NWEN 304. 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 introduces protocols and algorithms for networked and distributed systems. Specific emphasis will be placed on security, application layer protocols, and distributed algorithms.

Topics will include:

1. Cryptographic techniques such as RSA, secret sharing and authentication protocols.
2. Application layer protocols studied include the Distributed Naming Service (DNS), Hypertext Transport Protocols (HTTP) and Webservices.
3. Architectures and middleware for distributed applications.
4. Coordination in distributed applications using logical clocks and distributed versions of mutual exclusion, concurrency control and deadlock handling.

Objectives

Advanced Network Applications is part of the Engineering program at Victoria University of Wellington. BE graduates are expected to exhibit a number of graduate attributes at the completion of the program. This course contributes to the graduate attributes (GA) as indicated below. A full table of these attributes is available at [Graduate Attributes](#).

By the end of the course, students should be able to:

1. Explain the need for security, cryptographic techniques and how to apply them in networking, including the principles of authentication and authentication protocols, non repudiation, and digital signatures (GA [3\(a\)](#), [3\(b\)](#), [3\(d\)](#), [3\(e\)](#), [3\(f\)](#)).
2. Explain the role of the application layer, the socket API and the basics of building networked or distributed applications and the design of their associated protocols (GA [3\(a\)](#), [3\(b\)](#), [3\(d\)](#), [3\(e\)](#), [3\(f\)](#)).
3. Explain the idea of overlay networks, how they are designed, route, coordinate and are utilized for roles other than simply storage and distribution of media (GA [3\(a\)](#), [3\(b\)](#), [3\(d\)](#), [3\(e\)](#), [3\(f\)](#)).
4. Explain the principles of distributed systems, middleware and how applications coordinate to form larger networked applications than span multiple systems (GA [3\(a\)](#), [3\(b\)](#), [3\(d\)](#), [3\(e\)](#), [3\(f\)](#)).
5. Present explanations in written and oral form (GA [2\(b\)](#)).

Textbook

NWEN 304 will use [Computer Networking: A Top-Down Approach by Kurose and Ross, Fifth edition](#). Note that there is an International Edition that has a different front cover but should contain the same material.

In addition, we will draw upon material from:

- Distributed Systems: Principles and Paradigms by Tanenbaum and van Steen (will be available electronically).
- Operating Systems Concepts by Silberschatz, Galvin and Gagne (will be available electronically).
- Android Developer Guide (<http://developer.android.com/guide/index.html>)

You may also find the Wireless Application Development by Darcey and Conder to be a useful resource and VicBooks will have some in stock from mid March.

Lectures and Laboratories

A [schedule](#) of lecture topics, readings, assignments and project due dates is available online

Lectures for NWEN 304 are:

<u>Day</u>	<u>Time</u>	<u>Room</u>
Monday	1410-1500	CO216
Wednesday	1410-1500	CO216

Labs for NWEN 304 are:

<u>Day</u>	<u>Time</u>	<u>Room</u>
Monday	11-1pm	CO246
Wednesday	3-5pm	CO246

You will only need to sign up to **one** of the two lab times. In the labs will develop applications for the Android programming platform as part of the laboratory work.

Assessment

Your grade for NWEN 304 will be determined based on the following assessment weightings:

<u>Item</u>	<u>Weight</u>
Assignments	10%
Projects	30%
Final Examination	60%

Late submissions will be penalised at a rate of 10% per day, and will not be accepted more than five days after the due date. Late submissions will be accepted by prior arrangement with the course coordinator for valid reasons such as medical (doctors note required) and family emergencies.

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

Assignments and Laboratories

The internally assessed work consists of four assignments and three laboratory project. Laboratories will take place in CO246 but may also be worked upon at home or using other School machines. Copies of all work must be submitted via the online electronic submission system.

The assignments allow you to demonstrate your understanding of concepts (meeting objectives 1-4).

Dates and weightings for the assignments are shown in the table below.

<u>Assignment</u>	<u>Released</u>	<u>Due</u>	<u>Weight</u>
#1	28/02	20/03 23:59	2.5%
#2	21/03	10/04 23:59	2.5%
#3	11/04	15/05 23:59	2.5%
#4	16/05	05/06 23:59	2.5%

The laboratory projects allow you to demonstrate:

- That you can apply concepts in a practical context (meeting objectives 1-4).
- Your communication skills in demonstrations of your programs to the laboratory tutor (meeting objective 5).
- Your written communication skills through a written report (meeting objective 5).
- Your leadership and teamwork skills by working on project three in a small group (meeting objective 5).

Dates and weightings for the projects are shown in the table below. Submit your project code on the date specified. Project deliverables can include the code itself, a report and a demonstration.

<u>Project</u>	<u>Submit code</u>	<u>Submit report</u>	<u>Demonstration</u>	<u>Weight</u>
Introduction to programming network applications on the Android platform	03/04 23:59	No report due	Week 6	5%
Building a networked application	01/05 23:59	No report due	Week 8	10%
Innovation Project	29/05 23:59	30/05 9am	Week 12	10% (code/demo), 5% (report)

Group Work

Projects one and two are carried out individually. Each individual's mark will be based upon how well they satisfied the project requirements. This will be assessed both by our own inspection of the code and you demonstrating the project's functionality in a laboratory session.

Project three is carried out within a small group. Each member of a group will be given an individual mark based upon how well the group has satisfied the project requirements (up to 10%). The mark will be modified by how well we think that you understand the code (you must understand your own and the code written by your partners). This is assessed by interviewing you during the demonstration. In addition, you will receive up to an additional 5% based upon an individual report you submit at the end of the project.

Working in groups is not always straightforward so if you encounter problems please talk to one of the lecturers for the course and we will attempt to resolve the problem as amicably as possible.

Final Exam

The final examination will assess your understanding of the material covered in lectures and labs, but have a focus on the theoretical side of this course.

The [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 1 is 10 - 29 June.

Workload

In order to maintain satisfactory progress in NWEN 304, you should plan to spend an average of at least *10 to 12* hours per week on this paper. The course is 15 points, i.e. 150 hours of effort approximately overall for satisfactory progress. A plausible and approximate breakdown for these hours would be:

- Lectures: 2 hours
- Laboratory: 2 hours
- Assignments and Practical work: 6-8 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 304 is [Ian Welch](#). The lecturers for the course is [Ian Welch](#) and [Kris Bubendorfer](#). Their contact details are:

- [Ian Welch](#)
- [Cotton 337](#)
- +64 4 463 5664
- ian.welch@ecs.vuw.ac.nz

- [Kris Bubendorfer](#)
- [Cotton 338](#)
- +64 4 463 5045
- kris.bubendorfer@ecs.vuw.ac.nz

Announcements and Communication

The main means of communication outside of lectures will be the NWEN 304 web area at http://ecs.victoria.ac.nz/Courses/NWEN304_2011T1/. There you will find, among other things, this document, the [course schedule](#), [assignment handouts](#), [laboratory material](#), and the [NWEN 304 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.

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 50% of the total available marks across all the assignments and laboratories;
2. Obtain a D grade or better in the final exam.

Passing NWEN 304

To pass NWEN 304, a student must satisfy mandatory requirements and gain at least a **C** grade overall.

Withdrawal

The last date for withdrawal from NWEN 304 with entitlement to a refund of tuition fees is Fri 11 March 2011. The last date for withdrawal without being awarded a failing grade is Fri 13 May 2011 -- though later withdrawals may be approved by the Dean in special circumstances.

Due to the revised 2011 Academic Progress Statute that applies from Trimester 1 2011, students withdrawing after the regulation 2 week period will be deemed to have **failed** that course as far as the application of the academic progress statute is concerned.

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.
