Security Engineering - Course Outline
NWEN 405: 2015 Trimester 2

This document sets out the workload and assessment requirements for NWEN 405. 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 organiser and lecturer for NWEN 405 is Ian Welch. His contact details are:

- *Ian Welch*
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- ian.welch@ecs.vuw.ac.nz

The Class Rep for NWEN 405 will be elected during the first week of the course.

Class/lab Times and Room Numbers

Lectures for NWEN 405 are on Mondays and Wednesday from 1410-1500 in Alan MacDiarmid Building LT 106 (see the University Timetable for more information).

Trimester Dates and Examination Period Dates

NWEN 405 is a trimester 2 course. The examination period at the end of the course is 23 October - 14 November,

Objectives and Content

The Course

The Internet's role as a large, public, distributed system has raised security to an issue of critical importance. This course examines security mechanisms, security policies, security evaluation and risk management, security issues in networks and operating systems and software security..

Learning Objectives

By the end of the course, students should be able to:
1. Demonstrate their understanding of key security concepts through activities such as writing as reports or solving set problems (BE graduate attributes 2(b)) and 3(f)).
2. Demonstrate their understanding of key security engineering principles by applying those principles to the analysis of a secure system (BE graduate attributes 2(b)), 3(a), 3(c), 3(d)) and 3(f))).
3. Demonstrate their understanding of threats to computer systems by being able to carry out the assessment of the security of a networked system (BE graduate attributes 2(b)), 3(a), 3(c), 3(d)) and 3(f)).

Note: NWEN 405 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 assignment due dates is available at the course's blackboard site. A summary of the topics is:

1. Security policies and models (2 weeks)
2. Operating system security, application security issues and countermeasures (2 weeks)
3. Network security attacks and countermeasures (2 weeks)
4. Malware, countermeasures and the crime ecosystem (2 weeks)
5. Social engineering, usability and countermeasures (2 weeks)
6. Auditing computer systems (2 weeks)

In addition to attending lectures, you should spend about four hours per week doing assigned readings because these will be examinable. These readings will be included in the lecture schedule.

In order to maintain satisfactory progress in NWEN 405, 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: 2 hours
- Readings: 4 hours
- Practical work: 4 hours

Readings

There is no official course textbook. We will use a range of online resources including open source textbooks, white papers and will even recommend that you read some blogs. These materials will be provided via Blackboard and the University Safari Books Online subscription.

Materials and Equipment

All the course handouts will be available on the course web site. Notice that the slides may be incomplete and we expect students to attend lectures and complete them.

The School cannot provide in depth support for working at home but the projects may be done at home as long as you use a compatible version of the JDK and an installation of VirtualBox.

Assessment

Method of Assessment

There will be ten weekly quizzes, two projects and a final examination.

Quizzes

We will use frequent quizzes to help your learning. Recent research (see here or here for more details) has suggested that repeated "low stakes" quizzes that can help people's learning.

Generally the quizzes will have up to four to six short questions that generally relate to material taught in that week but might also include material from previous tests.

The quizzes will be submitted and graded online via Blackboard.

There will be ten quizzes, you can miss two without permission. Makeups are possible if you make an arrangement with the course coordinator.

Projects

There are two projects. Both require you to assess the vulnerability of computer systems. In both cases these assessments will be carried out on systems under either your or our control so you will not be violating either the University's code of student conduct or the New Zealand Crimes Act.

Project 1 -- eVoting

You are given the task of adding backdoors to an election system written in Java and auditing an already subverted election system to determine its vulnerabilities.

Part one of the project must be done individually but part two may be done in a group (all members of the group will receive the same mark).

Assessment is based upon creativity of the backdoor added to the system, how effectively it was at being hidden, quality of process used to locate backdoors and ability to communicate what you have done.

Project 2 -- TCP/IP vulnerabilities

You are given the task of designing some attacks against vulnerable TCP/IP protocols and carrying them out against a Linux operating system. You will produce a report on your attacks, the results and evaluation why they worked or didn't against. Assessment is based about thoroughness, correctness and ability to communicate what you have done.

Final Examination

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 final examination is run by the University rather than the School or course lecturers. If you are late for, or miss an exam, go to the Science Faculty Student and Academic Services Office immediately. There are special procedures in this case.

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 examination period for trimester 2 is 23 October - 14 November

Weightings of Each Assessment Task

Your grade for NWEN 405 will be determined based on the following assessment weightings:

Item	Weight	Note
Ten quizzes (best of eight count)	20%	Objective 1
e-Voting project (adding backdoors)	15%	Objective 1 and 2
e-Voting project (analysis)	15%	Objective 2
TCP/IP attacks hands-on lab	10%	Objective 3
Final examination	40%	Objective 1

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
Quizzes	Mondays midnight, weeks 3-12, all at midnight
eVoting project (adding backdoors)	Friday midnight, week 6
eVoting project (analysis)	Friday midnight week 8
TCP/IP attacks hands-on lab	Friday midnight week 10

Quizzes and project reports should be submitted via the Blackboard system.

Penalties

Late project work will be penalised 10%. Work which is more than five days late will not be marked. If you anticipate difficulty in meeting a deadline, please approach the course coordinator as soon as possible so an extension can be agreed upon.

Feedback is given the Monday following a quiz so you cannot take one late unless by prior discussion with the course coordinator who may arrange for a makeup. This should be for unforeseen circumstances because to get the learning effect of taking quizzes they need to be done on time.

Duration of Examination

The final examination will be **three hours long** and is closed book.

Special Requirements

This course has no special requirements.

Mandatory Requirements

The mandatory requirements are:

- Achieve at least a 'D' grade overall for project components.
- Achieve at least a 'D' grade in the final exam.

Passing NWEN 405

To pass NWEN 405, 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 405 Blackboard site. There you will find the lecture schedule, details of the reading assignments and submission links. The Blackboard course page announcements system will be used instead of the ECS Forum. 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.

We will be using Turnitin in this course to check the reports for plagarism.

Withdrawal

The last date for withdrawal from NWEN 405 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