

# NWEN403 (2018) - Advanced Network Engineering

## Prescription

This course extends the data communications and telecommunication taught in Computer Network Design, concentrating on new developments and network case studies. The course is designed for those aiming for careers that involve networking or network research and enhances the understanding of distributed systems through the applications of distributed systems in network management and Internet infrastructure.

## Course learning objectives

Students who pass this course should be able to:

1. design, set up and configure a secure and reliable enterprise network including setting up domain name translation services, switching and routing, monitoring and managing network devices and debugging network setup (GA 3(a), 3(b), 3(d), 3(e), 3(f)).
2. demonstrate advanced knowledge of network fundamentals (GA 3(a), 3(d), 3(e)).
3. demonstrate the ability to understand and evaluate research papers, and describe research problems in areas such as content centric networking, vehicular networks, cross-layer design and software defined radio, network measurement and advanced transport layer protocols (GA 3(a), 3(d), 3(e)).
4. present and communicate network engineering problems and solutions (GA 2(b)).

## Course content

NWEN 403 (Advanced Network Engineering) covers three components:

- network fundamentals - covering some fundamentals such as QoS, not covered in NWEN 302.
- practical skills - building a reliable and secure enterprise network.
- network research - investigating the state of the art in network research.

The main focus of this course is on exposing you to the front-line of network research and exploring your research potential. As such, literature survey and critical / forward thinking are essential in this course.

## Withdrawal from Course

Withdrawal dates and process:

<https://www.victoria.ac.nz/students/study/course-additions-withdrawals>

## Lecturers

**Qiang Fu (Coordinator)**

qiang.fu@vuw.ac.nz 04 4635233 ext 8829

414 Alan MacDiarmid Building, Kelburn

## Teaching Format

During the trimester there will be two lectures and one lab per week.

# Student feedback

Student feedback on University courses may be found at:  
[www.cad.vuw.ac.nz/feedback/feedback\\_display.php](http://www.cad.vuw.ac.nz/feedback/feedback_display.php)

## Dates (trimester, teaching & break dates)

- Teaching: 05 March 2018 - 08 June 2018
- Break: 23 April 2018 - 27 April 2018
- Study period: 11 June 2018 - 14 June 2018
- Exam period: 15 June 2018 - 04 July 2018

## Class Times and Room Numbers

### 05 March 2018 - 25 March 2018

- **Thursday** 15:10 - 16:00 – 201, 83 Fairlie Tce, Kelburn

### 05 March 2018 - 01 April 2018

- **Monday** 15:10 - 16:00 – 201, 83 Fairlie Tce, Kelburn
- **Tuesday** 15:10 - 16:00 – 201, 83 Fairlie Tce, Kelburn

### 02 April 2018 - 22 April 2018

- **Thursday** 15:10 - 16:00 – 201, 83 Fairlie Tce, Kelburn

### 09 April 2018 - 22 April 2018

- **Monday** 15:10 - 16:00 – 201, 83 Fairlie Tce, Kelburn
- **Tuesday** 15:10 - 16:00 – 201, 83 Fairlie Tce, Kelburn

### 30 April 2018 - 10 June 2018

- **Monday** 15:10 - 16:00 – 201, 83 Fairlie Tce, Kelburn
- **Tuesday** 15:10 - 16:00 – 201, 83 Fairlie Tce, Kelburn
- **Thursday** 15:10 - 16:00 – 201, 83 Fairlie Tce, Kelburn

## Other Classes

One lab session from week 2 to week 12.

## Set Texts and Recommended Readings

### Required

There are no required texts for this offering.

### Recommended

NWEN 403 will not use any specific textbook, although some of the material will be based on the NWEN302 text book by Kurose and Ross:

- *Computer Networks: A top down approach featuring the Internet*, Fifth Edition, Pearson, available from VicBooks.

Other useful books include:

- Andrew Tanenbaum, *Computer Networks*, 5th edition.
- Dimitri Bertsekas and Robert Gallager, *Data Networks*, second edition.
- William Stallings, *Data and Computer Communications*, ninth edition.
- William Stallings, *Highspeed Networks and Intranets*, second edition.
- Douglas Comer, *Computer Networks and Internets*, fifth edition
- Jorg Liebeherr and Magda Zarki, *Mastering Networks: an Internet lab manual*.
- IBM Redbook *TCP/IP Tutorial and Technical Overview* (published 2006).

Much of the material within the course is taken from a number of magazine, journal or conference papers

published by IEEE, ACM or Springer, or from Internet Drafts/RFCs from IETF. Many of them are available in the library and can be accessed from digital libraries such as:

- IEEE Explore
- ACM Digital Library
- SpringerLink
- IETF Datatracker
- CiteSeer
- Google Scholar

## Mandatory Course Requirements

In addition to achieving an overall pass mark of at least 50%, students must:

- Obtain at least 50% of the total available marks for the assignments, lab project, survey paper and presentation.
- Obtain a **D** grade or better in the final exam.

*If you believe that exceptional circumstances may prevent you from meeting the mandatory course requirements, contact the Course Coordinator for advice as soon as possible.*

## Assessment

There are two assignments, one lab project, one survey paper and one presentation for NWEN 403.

- The assignments are about understanding network fundamentals.
- The lab project is about building an enterprise network.
- The survey paper is about understanding the state of the art of network research.
- The presentation is for you to present your survey paper demonstrating the skills of communicating engineering problems and solutions.

Assignment 1	Week 5	CLO: 2	2.5%
Assignment 2	Week 9	CLO: 2	2.5%
Lab Project	Week 10	CLO: 1,2	15%
Interim survey paper	Week 6	CLO: 2,3	5%
Final survey paper	Week 11	CLO: 2,3	10%
Presentation	Week 12	CLO: 4	5%
Final Examination (2 hours)		CLO: 1,2,3,4	60%

## Penalties

Late submissions will be penalised by up to one grade boundary 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 may be required) and family emergencies.

## Submission & Return

All written reports must be submitted through the online submission system, accessible through the course web pages. Marks and comments will be returned through the ECS marking system, also available through the course web pages.

## Group Work

All the tasks must be carried out **individually** and **independently**.

# Workload

In order to maintain satisfactory progress in NWEN 403, you should plan to spend an average of at least 10 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 per week
- Reading and Practical work: 8 hours per week

# Teaching Plan

See: [https://ecs.victoria.ac.nz/Courses/NWEN403\\_2018T1/LectureSchedule](https://ecs.victoria.ac.nz/Courses/NWEN403_2018T1/LectureSchedule)

# Communication of Additional Information

All online material for this course can be accessed at [https://ecs.victoria.ac.nz/Courses/NWEN403\\_2018T1/](https://ecs.victoria.ac.nz/Courses/NWEN403_2018T1/)

# Links to General Course Information

- Academic Integrity and Plagiarism: <https://www.victoria.ac.nz/students/study/exams/integrity-plagiarism>
- Academic Progress: <https://www.victoria.ac.nz/students/study/progress/academic-progress> (including restrictions and non-engagement)
- Dates and deadlines: <https://www.victoria.ac.nz/students/study/dates>
- Grades: <https://www.victoria.ac.nz/students/study/progress/grades>
- Special passes: Refer to the Assessment Handbook, at <https://www.victoria.ac.nz/documents/policy/staff-policy/assessment-handbook.pdf>
- Statutes and policies, e.g. Student Conduct Statute: <https://www.victoria.ac.nz/about/governance/strategy>
- Student support: <https://www.victoria.ac.nz/students/support>
- Students with disabilities: [https://www.victoria.ac.nz/st\\_services/disability/](https://www.victoria.ac.nz/st_services/disability/)
- Student Charter: <https://www.victoria.ac.nz/learning-teaching/learning-partnerships/student-charter>
- Terms and Conditions: <https://www.victoria.ac.nz/study/apply-enrol/terms-conditions/student-contract>
- Turnitin: <http://www.cad.vuw.ac.nz/wiki/index.php/Turnitin>
- University structure: <https://www.victoria.ac.nz/about/governance/structure>
- VUWSA: <http://www.vuwsa.org.nz>

**Offering CRN:** [18604](#)

**Points:** 15

**Prerequisites:** NWEN 302, 30 further 300-level pts from (COMP, ECEN, NWEN, SWEN)

**Duration:** 05 March 2018 - 04 July 2018

**Starts:** Trimester 1

**Campus:** Kelburn