Operating Systems Design - Course Outline
NWEN 301: 2011 Trimester 1

This document sets out the workload and assessment requirements for NWEN 301. 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.

Objectives

Operating Systems Design is part of the Engineering program at Victoria University of Wellington. BE graduates are expected to exhbit 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 explain (GA 3(a) & 3(b)):

1. *What an operating system is, what it does, and how it is designed and constructed,*
2. *the process concept, lifecycle and concurrency models central to OS design,*
3. *process scheduling, interprocess communication, process synchronization and deadlock handling,*
4. *memory management schemes, such as segmentation, paging and virtual memory, and*
5. *basic mechanisms for protection and system security.*

The programming projects have been selected to emphasise these important operating systems concepts, resulting in:

1. *experience in writing operating system code (in the Win NT kernal) (GA 3(d) & 3(f)),*
2. *an appreciation of design in the selection of algorithms with an operating system kernel (GA 3(b)),*
3. *a practical understanding of a large body of production quality code (GA 3(f)), and*
4. *familiarity with UNIX/Linux; C programming, APIs and System Calls (GA 3(f)).*

Textbook

Operating System Concepts, 8th Edition,

Abraham Silberschatz, Peter Baer Galvin, Greg Gagne,

ISBN: 978-0-470-12872-5.

�2009
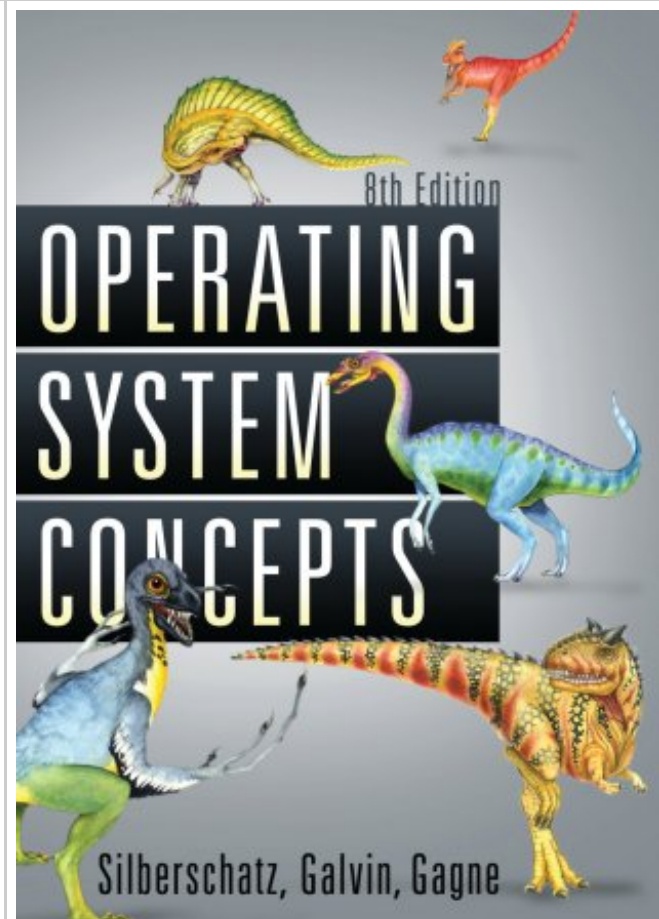
Lectures, Tutorials, Laboratories, and Practical work

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

Lectures for NWEN 301 are:

| 28 Feb � 5 Jun 2011 | Mon, Thu 1510 - 1600 | Murphy [Kelburn] | LT102 |

Labs for NWEN 301 are:

| 28 Feb � 5 Jun 2011 | Either of Tu 1400 - 1600 or Thu 1300 -1500 | Cotton [Kelburn] | CO246 |

Lecture topics:

- OS components
- Processes and threads
- Concurrency
- Synchronization primitives
- Higher-level synchronization structures
- Deadlock
- Transactions
- CPU scheduling
- Multilevel CPU scheduling
- Memory management
- Memory management (Paging)
- Demand paging (VM)
- File systems introduction
- Directories and abstraction
- File structures and space management
- Access scheduling and storage
- IO subsystems
- Security, domains and authentication
- Access matrices and protection schemes
- Distributed systems

Homework

Five homework assignments will be set on a fortnightly basis starting in week 2. These will be comprised of questions set from the current chapter of the text book and will help focus your learning and exam preparation.

Projects

There are three projects for NWEN 301. All projects build upon the Windows Research Kernel and involve the modification of production derived code to build and execute the windows operating system. We will be using the visual studio development environment to modify the windows kernel and will execute and debug using a Virtual Machine.

- Project 1 will familiarize you with the development environment, permitting you to compile, build, execute and debug your kernel. You will also add a minor system call to the kernel.
- Project 2 will add a system call to windows. The system call will return 'useful' system statistics.
- Project 3 is the major project. We will implement a fair thread scheduler.

Workload

In order to maintain satisfactory progress in NWEN 301, 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:

- Two lectures per week (1 hour each),
- Project work (approximately 3 hrs per week averaged over the course,
- Homework assignment - even weeks (1-2 hours each, 5 in total), and
- Independent study each week (4-5 hours)

Assessment

Your grade for NWEN 301 will be determined based on the following assessment weightings:

Item	Weight	Due
Homework	10% (2% ea)	even weeks
Project 1	5%	week 4
Project 2	13%	week 7
Project 3	17%	week 11
Final Examination	55%	TBA

Please note, all homework and project work is due at 23:59 on the Friday of the indicated week. All work will be submitted via the electronic submission system. All homework must be submitted in PDF - work submitted in any other format will **NOT** be marked.

Please note: copies of student work will be kept for the IPENZ BE accreditation process.

Policies and penalties for late submission of internally accessed work

10% per day late. After 5 days late work will not be accepted. I require a medical certificate in the case of late work due to illness.

The Exam

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.

Mandatory Requirements

Students must achieve a minimum D grade in the examination.

Passing NWEN 301

To pass NWEN 301, 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.

School of Engineering and Computer Science

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

The notice board for NWEN 301 is located on the second floor of the Cotton Building.

Staff

The course organiser and lecturer for (2nd half) of NWEN 301 is Kris Bubendorfer:
- *Kris Bubendorfer*
- Cotton 338
- +64 4 463 6484
- kris@ecs.vuw.ac.nz

The lecturer for the course (1st half) is Qiang Fu:

- *Qiang Fu*
- Cotton 329
- +64 4 463 5233x8829
- qiang.fu@ecs.vuw.ac.nz

Announcements and Communication

The main means of communication outside of lectures will be the NWEN 301 web area at http://ecs.victoria.ac.nz/Courses/NWEN301_2011T1/. There you will find, among other things, this document, the lecture schedule and assignment handouts, and the NWEN 301 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.

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.

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.