Systems Programming - Course Outline
NWEN 241: 2013 Trimester 1

This document sets out the workload and assessment requirements for NWEN 241. 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.

NWEN 241 (Systems Programming) focuses on low-level programming using C, which is commonly used for implementing operating systems including network protocol stacks and embedded system applications. It covers features such as low-level/direct access to memory, code efficiency and low runtime demand. In addition, the course introduces a high-level scripting language, Python, which is commonly used in network administration/management.

Objectives

Systems Programming is part of the Engineering and the BSc in Computer Science programmes at Victoria University of Wellington. BE and BSc (COMP) 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 are expected to have developed programming skills in C and Python. In C, a particular focus is on memory management. Specifically, students should:

1. Be able to use appropriate tools compiling/debugging C programs (GA BE 3(a), BE 3(d), BE 3(f), BSc (1)).
2. Be able to write C program using pointers and arrays, user-defined data types, input/output operations, bit-level operations, and user-defined and library routines (GA BE 3(a), BE 3(b), BE 3(d), BE 3(e), BE 3(f), BSc (1), BSc (4)).
3. Be able to use or understand the main techniques of dynamic memory management in C (GA BE 3(a), BE 3(e), BE 3(f), BSc (1)).
4. Be able to structure larger programs in multiple files (GA BE 3(e), BE 3(f), BSc (1)).
5. Be able to write simple Python programs (GA BE 3(a), BE 3(b), BE 3(e), BE 3(f), BSc (1)).
6. Understand the diferences between scripting and procedural programming languages (GA BE 3(a), BE 3(e), BE 3(f), BSc (1)).
7. Have developed skill at learning new programming languages(GA BE 3(a), BE 3(e), BE 3(f), BSc (1)).

Textbook

Students will need a good book on each of the C and Python languages. The two textbooks selected are:

C Programming:

- Al Kelley and Ira Pohl, *A Book on C* [4rd Edition], Addison-Wesley, 1998.

Python Programming (Free Online Copy):

- Think Python, How to Think Like a Computer Scientist by Allen B. Downey

Michael Kart at St. Edward's University has adapted the book for Python 3.0. You should use his version at:

- http://faculty.stedwards.edu/mikek/python/thinkpython.pdf

We'll also be making use of:

- Learning with Python: Interactive Edition (Using Python 3.x) by Brad Miller and David Ranum, Luther College

The C book can be bought at VUW book center. The other books are available FREE online.

Additional reading material

Other recommended C books:

Stephen G. Kochan, *Programming in C: A complete introduction to the C programming language* [3rd Edition], Sams Publishing, 2005.

K. N. King, *C Programming: A Modern Approach* [2nd Edition], W. W. Norton & Company, 2008.

| Stephen Prata, *C Primer Plus* [5th Edition], Sams Publishing, 2005.

| Brian W. Kernighan and Dennis M. Ritchie, *The C Programming Language* [2nd Edition], Prentice Hall, 1988.

| Paul Deitel and Harvey Deitel, *C How to Program* [6th Edition], Pearson Education, 2010.

| Adam Hoover, *System Programming* [1st Edition], Pearson Education, 2010.

Lectures, Tutorials, Laboratories, and Practical work

NWEN 241 is a trimester 1 course. The trimester starts on 4 Mar. The examination period at the end of the course is 14 June - 3 Jul,

A schedule of lecture topics, readings, and lab project due dates is available online.

There are two lectures and one large tutorial per week.

Lectures for NWEN 241are:

Day	Time	Room
Monday	1510-1600	New Kirk LT301
Thursday	1510-1600	New Kirk LT301

Tutorials for NWEN 241(starting from Week 3) are:

Day	Time	Room
Wednesday	1510-1600	Hunter LT323

There are Eight optional one-hour lab sessions per week, with a tutor present to provide help. The lab sessions start in Week 2. No signup is necessary.

A Timetable for these optional lab sessions is available here.

Attendance at lectures and tutorials is not compulsory, but should be viewed as an essential part of the learning process.

Practical Work

There are FIVE assignments and TWO lab projects for NWEN 241. The assignments include short questions and small programming tasks. The lab projects are larger programming tasks. All the programming tasks will be performed in a UNIX environment. All the assignments must be submitted through the online submission system.

- C assignments and lab project are for C programming, serving objectives 1 ~ 4, 6 and 7.
- Python assignments and lab project are for Python programming, serving objectives 5 ~ 7.

The lecturers will also provide a set of programming exercises to assist student learning. The exercises will not be assessed. However, the content of the exercises is examinable.

Students may use the lab facilities at any time, unless another course is booked in the lab and you would be interfering with the other course. However, tutors will be available to help students at supervised lab sessions throughout the week. These times are posted here. All the assignments and labs must be carried out **individually** and **independently**.

Workload

In order to maintain satisfactory progress in NWEN 241, 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 tutorials: 3 hours
- Reading and Practical work: 7 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 241 is <u>Qiang Fu</u>. The lecturers for the course are <u>Andy Linton</u> and <u>Qiang Fu</u>. Their contact details are:

- Dr Qiang Fu
- <u>Cotton 329</u>
- +64 4 463 5233 x8829
- <u>Qiang.Fu@ecs.vuw.ac.nz</u>

- Andy Linton
- <u>Cotton 331</u>
- +64 4 463 9792
- <u>Andy.Linton@ecs.vuw.ac.nz</u>

Tutors

- TBA

Class representatives (To be appointed)

Announcements and Communication

The main means of communication outside of lecture will be the NWEN 241 web area at <u>http://ecs.victoria.ac.nz/Courses/NWEN241_2013T1/</u>. There you will find, among other things, this document, the <u>lecture schedule</u> and <u>assignment handouts</u>, and the <u>NWEN 241 Forum</u>. 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.

Assessment

Your grade for NWEN 241 will be determined based on the following assessment weightings:

<u>Item</u>	<u>Weight</u>	<u>Due</u>
C: Assignment 1	2.5%	Tue, 23:59, Week 3
C: Assignment 2	2.5%	Tue, 23:59, Week 4
C: Assignment 3	5%	Tue, 23:59, Week 6
Python: Assignment 1	2.5%	Tue, 23:59, Week 10
Python: Assignment 2	2.5%	Tue, 23:59, Week 11
C: Lab Project	15%	Fri, 23:59, Week 8
Python: Lab Project	10%	Fri, 23:59, Week 11
Final Examination	60%	TBD

You are expected to do all the assignments/labs.

The policy on late submission is as follows:

Assignments
- Model solutions to the assignments will be released shortly after the assignment deadline. This means late submissions will NOT be accepted, unless you have made prior arrangement with the course coordinator for valid reasons such as medical and family emergencies.

Lab Projects
- Each lab project that is late (ie, submitted on the submission system after the deadline) will be penalised by 20 marks if it is up to 24 hours late, and penalised by 40 marks if it is between 24 hours and 48 hours late. Any work submitted more than 48 hours after the deadline **will receive 0 marks**.
- Each student will have 3 "late days" which you may choose to use for any lab project(s) during the course. There will be no penalty applied for these late days. You do not need to apply for these - any late days you have left will be automatically applied to lab projects that you submit late.
- The late days are intended to cover minor illnesses or other personal reasons for being late. You should only ask for extensions in the case of more significant or longer lasting problems (and you may need documentation). Do not waste "late days" on procrastination!

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

The Exam

The final examination will assess your understanding of the material covered in lectures and labs, and will assess your ability to apply the knowledge gained using practical techniques.

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 T1 is 14 June - 3 July 2013.

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 lab projects;
2. Obtain a D grade or better in the final exam.

Passing NWEN 241

To pass NWEN 241, a student must satisfy mandatory requirements and gain at least a **C** grade overall.

Withdrawal

The last date for withdrawal from NWEN 241 with entitlement to a refund of tuition fees is Friday 15 March 2013. The last date for withdrawal without being regarded as having failed the course is Friday 17 May 2013 -- 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