

# Computer Organisation - Course Outline

## NWEN 242: 2013 Trimester 2

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This document sets out the workload and assessment requirements for NWEN 242. 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

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NWEN242 introduces the common physical components of a computer and their interconnection. It also studies the process of program execution, the fundamentals of assembly language programming, data representation, computer arithmetic, and machine instruction design. This course focuses on the boundary between hardware and software and explores the levels of hardware in the vicinity of this boundary. The first part of the course considers the concepts of assembly language programming, data representation and computer arithmetic. The second part considers datapath, control, pipelining, memories, and interface between processors and peripherals. The purpose of the course is to give you an overall understanding of how the technologies that we use to build computers influence the design of the programming languages and the efficiency of the algorithms that we use on them. By the end of the course you should be able to demonstrate a good understanding of:

1. Main components of a typical computer and their interconnections,
2. Appropriate ways to represent data in hardware,
3. Writing simpler and understanding more complex MIPS assembly language programs,
4. The way a computer executes arithmetic operations,
5. Logic designs for:
  1. Performing computations (datapaths),
  2. Controlling datapaths,
  3. Storing information (memories), and
  4. Improving datapaths and memory performance (pipelining and caches).
6. How these designs influence:
  1. The basic operations available to programmers, and
  2. The performance of computer programs.

The objectives 1, 2, 3, and 4 demonstrate the ability to apply mathematical and engineering sciences to gain understanding of a complex engineering problem (BE graduate attribute 3(a)). The objective 5 develops competence in design of computer system, ability to demonstrate their efficacy, and understanding of the limitations of computer system design methods (BE graduate attribute 3(f), BE graduate attribute 3(b), and BE graduate attribute 3(d)), respectively. The objective 6 develops ability to solve models that predict behaviour of a computer system (BE graduate attribute 3(c)).

It is expected that students can understand the semantics of simple Java or C programs. Tutorials on basic c programming will be offered from week 2 to week 5 (CO246).

### Textbook

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The textbook for NWEN 242 is: Hennessy and Patterson *Computer Organization and Design*, (Fourth Edition) Morgan Kaufmann.

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### Lectures, Tutorials, Laboratories, and Practical work

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

Lectures for NWEN242 are:

Tuesday, Wednesday, and Thursday from 11:00am to 11:50am.

Lectures will introduce and discuss the main concepts and theories, while tutorials will help you review the discussions in lectures and understand how the concepts and theories can be applied.

Lab project will start from week 2. You will need to sign up using <http://signups.victoria.ac.nz/>.

### Assignments and Projects

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There will be three homework assignments and three lab projects for this course. Homework assignments and lab projects will enable you to practice concepts and theories introduced in lectures. They are an important part of your preparation for the midterm test and the final exam. You will find submission instruction in the homework page and in the description of each lab project when they become available.

You are expected to do all the lab projects and all the homework assignments. Each lab project is worth 10% of your final grade. Each homework assignment is worth 3% of your final grade. The objective of each lab project is given below:

- Lab project 1: the objective of this lab is for students to become familiar with assembly programming.
- Lab project 2: the objective of this lab is to test students' understanding of pipeline datapath operation and hazards.
- Lab project 3: the objective of this lab is to enhance students' understanding of caches and memory management in a computer system.

## Workload

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In order to maintain satisfactory progress in NWEN242, 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:

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

## School of Engineering and Computer Science

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

The notice board for NWEN242 is located on the second floor of the Cotton Building.

## Staff

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The course organiser for NWEN242 is Kris Bubendorfer. The lecturers for the course are Aaron Chen and Bryan Ng. Their contact details are:

- *Kris Bubendorfer*
- [Cotton 338](#)
- +64 4 463 6484
- [kris@ecs.vuw.ac.nz](mailto:kris@ecs.vuw.ac.nz)
  
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- Cotton 353
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## Announcements and Communication

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The main means of communication outside of lectures will be the NWEN 242 web area at [http://ecs.victoria.ac.nz/Courses/NWEN242\\_2013T2/](http://ecs.victoria.ac.nz/Courses/NWEN242_2013T2/). There you will find, among other things, this document, the [lecture schedule](#) and [assignment handouts](#), and the [NWEN 242 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.

## Assessment

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Your grade for NWEN 242 will be determined based on the following assessment weightings:

<u>Item</u>	<u>Weight</u>	<u>Due Date</u>
Homework assignment 1	3%	Monday Week 4
Homework assignment 2	3%	Monday Week 7
Homework assignment 3	3 %	Monday Week 10
Lab project 1	10%	Monday Week 6
Lab project 2	10%	Monday Week 9

Lab project 3	10%	Monday Week 12
Mid-term test	11%	Thursday Week 6
Final Examination	50%	TBA

No late submissions will be accepted for homework assignments. So, late submissions will achieve 0 marks. If you experience any problems in submitting your homework assignment please identify those to the lecturers as soon as practical. Project work will be penalized at a rate of 10% per day late. However, for project work you have up to five grace days over the period of the course. This is a total number of days. Hence if you use all five days up on your first project, subsequent late projects will be penalized.

## Tests and Exams

The **mid-term test** will be 30 minutes.. The mid-term test will help you gauge how well you understand the material in the first half of the course. The mid-trimester test is worth 12% of your final grade.

The **final exam** is worth 50% of your final grade. You may be asked questions about any of the topics that we have covered in lectures and tutorials (this corresponds, roughly, to Chapters 1 to 7 and Appendices B and C of the fourth edition of the course textbook), or in assignments and lab projects.

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 2 is 25 October - 16 November.

## 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. You must achieve at least a D grade in the final examination.
2. You must attempt all projects.

## Passing NWEN242

To pass NWEN242, a student must satisfy mandatory requirements and gain at least a **C** grade overall.

## Withdrawal

The last date for withdrawal from NWEN 242 with entitlement to a refund of tuition fees is Friday 26 July 2013. The last date for withdrawal without being regarded as having failed the course is Friday 27 September 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

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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](#)

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