Prescription

The course develops an understanding of the structure of computers and how they execute programs. The course introduces the fundamentals of assembly language programming, data representation and computer arithmetic. It then develops an understanding of microprocessor architecture at the hardware level. Topics include digital electronics, arithmetic and logic unit (ALU), data paths, pipelining, memory hierarchy, I/O and motivating examples of computer systems. NB: this course runs for the first time in 2019.

Course learning objectives

Students who pass this course will be able to:

1. Describe the main components of a typical computer and their interconnections, standard ways of representing data in hardware, and the operation of hardware logic for arithmetic operations.

2. Demonstrate a good understanding of appropriate ways to represent data in hardware.

3. Write simple and understand more complex MIPS assembly language programs.

4. Demonstrate a good understanding of the way a computer executes arithmetic operations.

5. Analyse, evaluate, and construct hardware logic designs for performing computations, controlling datapaths, storing information and organising memory.

6. Analyse the effects of the hardware logic designs in a computer on the basic operations in programming languages and the performance of computer programs.

Course content

NWEN 342 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.

Withdrawal from Course

Withdrawal dates and process:
https://www.victoria.ac.nz/students/study/course-additions-withdrawals

Lecturers

Robin Dykstra (Coordinator)

robin.dykstra@vuw.ac.nz   04 463 5233 ext 7013

415 Alan MacDiarmid Building, Kelburn

Kris Bubendorfer

kris.bubendorfer@vuw.ac.nz   04 4636484

129 Cotton, Kelburn

Teaching Format

Two Lectures a week (Tuesday, Wednesday). Ad-hoc tutorials (only when scheduled) will be held in the Friday lecture slot. Lab project will start from week 2.

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

Student feedback

Student feedback on University courses may be found at:
 www.cad.vuw.ac.nz/feedback/feedback_display.php. As 2019 is the first year this course has been offered there is no feedback on previous offerings of the course.

Dates (trimester, teaching & break dates)

- Teaching: 04 March 2019 - 09 June 2019
- Break: 15 April 2019 - 28 April 2019
- Study period: 10 June 2019 - 13 June 2019
- Exam period: 14 June 2019 - 29 June 2019

Class Times and Room Numbers

04 March 2019 - 14 April 2019
- **Tuesday** 14:00 - 14:50 – LT103, Hugh Mackenzie, Kelburn
- **Wednesday** 17:10 - 18:00 – LT001, Hugh Mackenzie, Kelburn
- **Friday** 17:10 - 18:00 – LT001, Hugh Mackenzie, Kelburn

29 April 2019 - 09 June 2019
- **Tuesday** 14:00 - 14:50 – LT103, Hugh Mackenzie, Kelburn
- **Wednesday** 17:10 - 18:00 – LT001, Hugh Mackenzie, Kelburn
- **Friday** 17:10 - 18:00 – LT001, Hugh Mackenzie, Kelburn

Set Texts and Recommended Readings

Required

There are no required texts for this offering.

Recommended

- Patterson and Hennessy *Computer Organization and Design - The Hardware/Software Interface*, (Fifth Edition), Morgan Kaufmann.

Mandatory Course Requirements

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

- gain at least a **D** grade in the final examination
- attempt all lab projects.

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 will be FOUR (4) homework assignments and THREE (3) 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 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.

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.

Assessment Item	Due Date or Test Date	CLO(s)	Percentage
Homework Assignment 1	Week 4	CLO: 1,2,3,6	2.5%
Homework Assignment 2	Week 6	CLO: 3,4,5,6	2.5%
Homework Assignment 3	Week 9	CLO: 5,6	2.5%
Homework Assignment 4	Week 11	CLO: 5,6	2.5%
Lab Project 1	Week 5	CLO: 2,3	10%
Lab Project 2	Week 10	CLO: 5,6	10%
Lab Project 3	Week 12	CLO: 5,6	10%
Final Examination (2 hours)		CLO: 1,2,3,4,5,6	60%

Penalties

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.

Extensions

Individual extensions will only be granted in exceptional personal circumstances, and should be negotiated with the course coordinator before the deadline whenever possible. Documentation (eg, medical certificate) may be required.

Submission & Return

Laboratory exercises and assignments are submitted through the ECS assessment system. Marks and comments will also be returned through the ECS assessment system.

Workload

In order to maintain satisfactory progress in NWEN 342, you should plan to spend an average of 10 hours per week on this paper. A plausible and approximate breakdown for these hours would be:

- Lectures and tutorials: 2-3 hours
- Independent study: 3 hours
- Homework assignments: 1 hours
- Lab projects: 3 hours

Teaching Plan

See: https://ecs.victoria.ac.nz/Courses/NWEN342_2019T1/LectureSchedule

Communication of Additional Information

The main means of communication outside of lectures will be the NWEN 342 web area at https://ecs.victoria.ac.nz/Courses/NWEN342_2019T1/

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-progess (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/
- 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: 30045

Points: 15
Prerequisites: NWEN 241, ENGR 123 or MATH 161
Restrictions: NWEN 242
Duration: 04 March 2019 - 30 June 2019
Starts: Trimester 1
Campus: Kelburn