

## 1. Calendar Information

### ENCM 369 Computer Organization

Organization of a simple stored-program computer: CPU, busses and memory. Instruction sets, machine code, and assembly language. Conventions for assembly language generated by compilers. Floating-point number representation. Hardware organization of simple processors. Address translation and virtual memory. Very introductory examples of input/output devices, interrupt handling and multi-tasking systems.

Course Hours: H(3-1T-1.5)

## 2. Learning Outcomes

At the end of this course, you will be able to:

- Understand basic computer organization: roles of processors, main memory, and input/output devices.
- Understand the concept of programs as sequences of machine instructions.
- Understand the relationship between assembly language and machine language; development of skill in assembly language programming; understanding the relationship between high-level compiled languages and assembly language.
- Understand arithmetic and logical operations with integer operands.
- Understand floating-point number systems and operations.
- Understand simple datapath and control designs for processors.
- Understand memory organization, including cache structures and virtual memory schemes.

## 3. Timetable

Section	Days of the Week	Start Time	Duration (Minutes)	Location
L01	TuTh	14:00	75	SA 104
L02	TuTh	12:30	75	ST 147
T01	M	14:00	50	ENE 239
T02	M	15:30	50	ENE 239
B01	M	15:30	75	ICT 215
B02	M	14:00	75	ICT 216

## 4. Course Instructors

### Lecturers

Section	Name	Phone	Office	Email
L01, T01, T02	S. A. Norman	220-8642	ICT 411	norman@ucalgary.ca
L02, B01, B02	N. R. Bartley	220-5060	ICT 306	nbartley@ucalgary.ca

## 5. Examinations

The following examinations will be held in this course:

- **Midterm examination:** To be scheduled by the Department of Electrical and Computer Engineering undergraduate exam coordinator. The midterm examination is *closed-book* and *closed-notes*.
- **Final examination:** Duration 3 hours, to be scheduled by the Registrar's Office. The final examination is *closed-book* and *closed-notes*.

**Note:** The timetable for Registrar Scheduled exams can be found at the University's Enrolment Services website, <http://www.ucalgary.ca/registrar/>.

## 6. Use of Calculators in Examinations

## 7. Final Grade Determination

The final grade in this course will be based on the following components:

Component	Weight
Laboratory Assignments	20 %
Midterm Examination	30 %
Final Examination	50 %
<b>TOTAL</b>	<b>100 %</b>

**Note:** A mark of 40% or higher on the final exam is needed to pass the course as a whole. The course instructors reserve the right to reduce this threshold of 40% if it is judged after marking the final exam that the final exam was more difficult than intended. Conversion from a score out of 100 to a letter grade will be done using a scale determined after the final examination has been marked. This allows the creation of a

scale appropriate to the relative difficulty or easiness of the mid-session test and final exam. As a *rough guideline*, here is the scale used in this course in the recent past:

Grade	Total Mark	Grade	Total Mark
A+	90.5%	A	86.0%
A-	81.5%	B+	77%
B	72.5%	B-	68%
C+	63.5%	C	59.0%
C-	54.5%	D+	50%
D	45.5%	F	< 45.5%

For example, a student with 18.77 / 20 for labs, 19.00 / 30 for the mid-session test, and 37.08 / 50 for the final exam would have got a course score of  $18.77 + 19.00 + 37.08 = 74.85$  and would have been given a B in the course. *The scale used this year will be similar but probably not identical to scales from other years.*

## 8. Principles of Conduct

The University of Calgary Calendar includes a statement on the Principles of Conduct expected of all members of the University community (including students, faculty, administrators, any category of staff, practicum supervisors and volunteers) whether on or off the University's property. This statement applies in all situations where the Members of the University Community are acting in their University capacities. All Members of the University Community have a responsibility to familiarize themselves with this statement, which is available at:

<http://www.ucalgary.ca/pubs/calendar/current/j-2.html>

The Engineering Students' Society Code of Conduct was developed to ensure that students are safe and free from danger and risk, and that discussion, criticism and comment are encouraged within a framework of professional behaviour. The Engineering Students' Society Code of Conduct is available at:

[http://ess.ucalgary.ca/downloads/official\\_documents/Code\\_of\\_Conduct.pdf](http://ess.ucalgary.ca/downloads/official_documents/Code_of_Conduct.pdf)

## 9. Academic Misconduct/Plagiarism

The University of Calgary Calendar defines plagiarism as:

“submitting or presenting work in a course as if it were the student's own work done expressly for that particular course when, in fact, it is not.”

Plagiarism is academic misconduct. Please read the section in the University Calendar on Plagiarism/Cheating/Other Academic Misconduct which is available at:

<http://www.ucalgary.ca/pubs/calendar/current/k-2.html>

## 10. Textbook

The following textbook is required for this course:

Title	Computer Organization and Design: The Hardware/Software Interface
Author(s)	David A. Patterson and John L. Hennessy
Edition, Year	4th Edition
Publisher	Morgan Kaufmann Publishers, 2008 (ISBN 978-0-12-374493-7)

## 11. Academic Accommodation Policy

It is the student's responsibility to request academic accommodations. If you are a student with a documented disability who may require academic accommodation and have not registered with the Disability Resource Centre, please contact their office at 403.220.8237. Students who have not registered with the Disability Resource Centre are not eligible for formal academic accommodation. You are also required to discuss your needs with your instructor no later than fourteen (14) days after the start of this course.

## 12. Engineering FOIP Policy

### SCHULICH SCHOOL OF ENGINEERING - UNIVERSITY OF CALGARY POLICY FOR IMPLEMENTATION OF FOIP REQUIREMENTS Protection of Student Examinations and Course Work Under the Freedom of Information and Protection of Privacy Act of the Province of Alberta

The Schulich School of Engineering policy is intended to ensure that examinations and term-work of students in engineering courses are protected with respect to privacy. The philosophy behind the policy is that marked student examinations and term-work (hereafter called "student's work") should be available only to the student and to staff in the Schulich School of Engineering who have a need to see the material. This includes academic staff, graduate assistants and support staff. Please read the Schulich School of Engineering FOIP Policy:

<http://www.ucalgary.ca/eng/courses/Engg/FOIPPOLICY.html>

## 13. Environmental Health and Safety

The University of Calgary and the Schulich School of Engineering operate on the premise of the Internal Responsibility System which identifies that all individuals, including students and visitors, share the responsibility for ensuring a safe working, learning and living environment.

To this end students are responsible for:

- reporting any unsafe conditions or actions to their Professor or a University Representative;
- reporting all accidents or incidents to their Professor or a University Representative as soon as possible after the incident has occurred; there is a requirement to report incidents which include, a sudden or unforeseen event which could or has caused an injury or occupational illness; a release of hazardous materials to the environment, or a near miss;
- understanding that just because a hazard can't be seen doesn't mean it doesn't exist and evacuate the building immediately if the fire bells are initiated leaving through the nearest exit and moving away from the building. Failure to do so puts

your safety and the safety of emergency responders at risk and goes against our premise of Safety First.

For more information on Occupational Health & Safety, please consult the University's Environmental Health and Safety website:

<http://www.ucalgary.ca/safety>

## 14. Additional Course Information

### Course Web Site

You are strongly encouraged to use the Internet to look up course information. For example, you will be able to use the Web to read: this outline; information about the teaching assistants; many lecture-related handouts; all lab handouts; some lab solutions. (Not much of this information will be available right at the beginning of the term. The set of course pages will grow as the term progresses.) The URL for the ENCM 369 Home is

<http://www.ucalgary.ca/People/Norman/encm369winter2010/>

### Get Help, But Don't Cheat!

Do the lab assignments by yourself, or in active collaboration with a partner when you are permitted to work with a partner. If you copy someone else's work or let someone else figure out all the difficult exercises for you, you will not learn very much.

This does not mean that you should not get help from others while you are doing your assignments. You are encouraged to discuss the assignments with instructors and fellow students, since this is one of the best ways to learn the material. However, you should not let anyone write your programs or solve other exercises for you. When you hand in your assignments, ask yourself two questions:

1. *Do I understand all the material I am handing in?*
2. *Could I do this assignment over again without any help?*

The answer to both questions should be **YES**.

Computers allow electronic copying of programs, which makes it very easy to cheat in a course like ENCM 369. If you are caught cheating you may be reported to the Dean's Office for appropriate discipline. If you cheat and don't get caught, you are still in trouble, because examination marks count much more than assignment marks in your final course grade.

### Missed or Delayed Term Work

You are expected to complete all lab assignments and hand them in on time, and you are expected to write the mid-session test at the scheduled time.

If you don't hand in some term work due to illness, domestic affliction, or another legitimate reason, the course instructors are willing to make accommodations, but only if you report the problem to your lecture instructor--(em not} a graduate teaching assistant--as soon as is reasonably possible. Accommodations for missed term work will be decided on a case-by-case basis; typically they will involve either accepting lab assignments after the due date or making changes to the weighting used to compute the course grade.

*Revised on 22 December 2009*