

CMPE401 – Computer Interfacing Course Outline and Description

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Overview

Welcome to CMPE401 – Computer Interfacing. In this course we will build upon the skills you acquired in EE 380 or CMPUT 229. We will concentrate on the design and use of digital interfaces, including memory, serial, parallel, synchronous and asynchronous interfaces, hardware implementations of interrupts, buses, input/output devices.

The course website is: www.ece.ualberta.ca/~cmpe401. There you can find all the information regarding this course, including lab schedules, due dates, and important notifications.

The lab instructor is Nancy Minderman nem@ece.ualberta.ca; she takes care of everything related to the lab contents and equipment. She can certainly better answer any questions regarding the labs.

Course topics

- Review of the 68332 microcontroller: registers, instructions, addressing modes, the user & supervisor modes, interrupt handling
- Embedded system software architecture: operating systems, real-time kernels, device drivers, MicroC/OS-II
- The RS-232 serial interface, the 68681 Dual Asynchronous Receiver Transmitter (DUART) Interface Chip
- Network interfaces: the OSI layered model, UDP/IP, TCP/IP, client-server interaction, the socket API, the lwIP stack
- Digital-to-analog and analog-to-digital conversion
- Interfacing to sensors, actuators, stepper motors, servos, the Motorola Time Processor Unit (TPU)
- The 68000 System Bus: read cycles, write cycles, read-modify-write cycles, IACK cycles, direct memory access (DMA)
- High-speed digital signals, transmission lines, termination methods
- Survey of Other Illustrative Serial Interfaces: RS-422, Ethernet, SCI, USB, Firewire
- Survey of Microcomputer Interfaces: memory interfaces, Intel microprocessor buses, ISA, EISA, PCI, cPCI, Rambus
- Survey of Other Illustrative Parallel Interfaces: IEEE-1284 printer port, IEEE-488 instrument bus, Unibus

Suggested Textbook

- Alan Clements, *68000 Family Assembly Language-W/3"Disk*, (ITP Nelson, ISBN 0534932754)
- Thomas L. Harman, *The Motorola MC68332 Microcontroller: Program Design, Assembly Language Programming, and Interfacing*, (Prentice Hall, 1991, ISBN 0-13-603127-7)

Regarding notes

Handouts are going to be available for purchasing at the EE Club. Taking good notes in class is an important skill that requires years of practice to master. Obviously you can copy down whatever is written on the board or transparencies, however you shouldn't stop there. I may say some things that I don't write down, if you think they are important then you should add them to your notes. If something confuses you, highlight it and seek clarification, either by consulting the textbook, speaking with your classmates, or asking me. Once you have the matter sorted out, modify or augment you class notes accordingly so that you are unlikely to meet the same confusion again.

Timetable and office hours

Lectures: Mon. Wed. Fri. 10:00am – 10:50am. ETLE 2-002
Office hours: Wednesdays 10:00 am. – 12:30 pm. W2-051 (ECERF)
Labs: Check the course website for detailed info. ETLC 5-002

If for any reason you cannot come at the specified office hours you can certainly send me an e-mail to set up an appointment, we can arrange a meeting that fits our schedules. Feel free to come and discuss any questions, problems, complications, etc. that you may have!

Labs

There are four labs in this course:

- Introduction to MicroC/OS-II Running on a 68332-based Microcomputer
- Serial Interfacing Using the 68681 DUART
- Serial Interfacing Over SLIP to a TCP/IP Stack in an Embedded System
- Stepper Motor Control Using the Motorola Time Processor Unit (TPU)

Satisfactory performance in the lab is required to pass the course.

Marking scheme

Assignments (~5) and quiz (~1)	10%
Labs (4)	20%
Midterm	30%
Final	40%

Unless otherwise specified, your assignments should be submitted by placing them in the appropriate assignment box (just outside the entrance of the ECE reception office) no later than the indicated date.

A due date will be specified for each assignment separately, in order to be fair with everyone, and for logical reasons, please note that late assignments are NOT ACCEPTED! If you have a BIG reason for not submitting your assignment on time you SHOULD contact me BEFORE the deadline so we can work something out.

For the midterm and final examinations, only programmable and non-programmable calculators approved by the faculty of engineering will be permitted. Programmable calculators must be cleared of any stored programs and information prior to the examinations. You are encouraged to go to the following site for more information in this matter.

<http://www.engineering.ualberta.ca/calculator.cfm>

To approve the course you must meet the following requirements:

- All labs must be completed satisfactorily and you must earn a minimum lab grade of 50%.
- You should achieve a total final raw score of at least 50%.

Final grade

Your final grade will be expressed in a letter grade according to the guidelines stipulated in §23.4(4) of the University Calendar. Please consult that section of the calendar for details.

Examination dates

Midterm examination: Wednesday October 24, 2007 (during class hours)
Final examination: TBA

Academic integrity

The University of Alberta is committed to the highest standards of academic integrity and honesty. Students are expected to be familiar with these standards regarding academic honesty and to uphold the policies of the University in this respect. Students are particularly urged to familiarize themselves with the provisions of the Code of Student Behaviour, online at

www.ualberta.ca/secretariat/appeals.htm

and avoid any behaviour which could potentially result in suspicions of cheating, plagiarism, misrepresentation of facts and/or participation in an offence. Academic dishonesty is a serious offence and can result in suspension or expulsion from the University.

Notes

The above constitutes the basic outline and description of the course.
Policy about course outline can be found in §23.4(2) of the University Calendar.