

ELEX 7660 Course Information

Corrected second Lab day to Tuesday (Jan 14).

Instructor

Ed Casas. You can reach me by e-mail at ecasas@bcit.ca, by phone at +1 604 432 8936 or by posting a question to the course web site (see below).

Office Hours

My office is in SW1-3061, accessed through SW1-3059. Office hours are:

Day	Time
Monday	11:30 PM–2:20 PM
Tuesday	10:30 AM–12:20 PM

It's a good idea to let me know if you intend to come by as I may be away from my office.

Course Web Site

Lecture notes, lab instructions, assignments and solutions will be handed out during lectures and will also be made available on the course web site: <https://learn.bcit.ca/d21/home/445711>.

Questions of general interest should be asked using the site's "Discussions" feature.

Do not send "e-mail" from the course web site – I may not see it. Instead, use the e-mail address above.

Lecture, Lab and Exam Schedule

Lectures are Tuesday and Friday from 12:30 to 1:20 PM.

Labs will be in SW1-3060 and are:

Day	Time
Mondays (Set 6T)	3:30 PM– 5:20 PM
Tuesdays (Set 6S)	2:30 PM–4:20 PM

Lab instructions will be handed out and posted on the course web site. The tentative lab schedule is as follows:

Week of	Lab
January 1	No Lab
January 8	No Lab
January 15	Lab 1
January 22	Lab 2
January 29	Lab 3 Project Abstract Due
February 5	Lab 4
February 12	Holiday Monday Project Proposal Due
February 19	Lab 5
February 26	Project Lab 1
March 5	Project Lab 2
March 12	Spring Break
March 19	Project Lab 3
March 26	Project Lab 4
April 2	Holiday Monday Optional Project Lab
April 9	Project Demonstrations Project Report Due
April 16	Final Exams

Two one-hour mid-term exams are tentatively scheduled for Tuesday, February 20 and Friday, February 23. A three-hour final exam will be scheduled the week of April 16.

Schedule changes will be posted on the course web site.

Lecture notes, assignments, exams and solutions from last year's version of this course are archived at <http://www.ece.ubc.ca/~edc/7660.jan2017/>.

Prerequisites

I assume students are familiar with: command-line interfaces, the C programming language, binary number systems, two's complement arithmetic, logic levels, logic gates, adders, multiplexers, propagation delay, D flip-flops, setup/hold times, state machines and timing diagrams.

Evaluation

Component	Weight
Project	30 %
Labs	20 %
Final Exam	20 %
Mid-Term Exam	15 %
Assignments	15 %

Assignments

Several assignments will be given out during the term. You will have at least one week to complete each assignment. Solutions will be handed out for all questions but some questions may not be marked.

Labs

The mark for each lab will be calculated as follows:

Component	Weight
pre-lab assignment	20%
completion of lab objectives	60%
accurate and complete lab report	20%

You will have approximately one week to complete each pre-lab assignment. The purpose of this assignment is to prepare for the lab. If the pre-lab report is not submitted before the start of the lab you will receive a mark of zero for that pre-lab.

In most cases you will need to demonstrate a working design to get the lab completion mark. In other cases you will need to submit screen captures or simulation results. In these cases you must submit a lab report to get marks for completing the lab.

Students may be asked to explain a part of their solution or answer a brief question (e.g. “what is the purpose of this section?”) to get credit for completing the lab.

Students who come to labs with an original solution free of syntax errors should be able to complete each lab in the allotted time. However, incomplete labs may be demonstrated during the lab sessions set aside for project work – and only then. These solutions will be subject to more than the usual level of scrutiny.

You will have at least one week after you complete your lab to submit your lab report to the course web site. Lab reports not submitted when the reports are collected will receive a mark of zero. You may not submit a report for incomplete lab. This implies that

demonstrating a lab late will incur a penalty of 20% for that lab.

Only parts of each pre-lab and lab report will be marked.

You do not have to pass the lab portion of the course to pass the course.

Project

Students will work in pairs on a project of their choosing. The course web site has links to similar courses and examples of student projects. Review these to see the range of projects and level of complexity that are possible.

Schedule and Deliverables

The project deliverables are:

end of January A one-page abstract with the names of the team members and an outline of the project objectives.

mid-February A multi-page proposal with a high-level description including block diagram(s), a parts list, milestones and references.

mid-April A final report fully documenting what was achieved. It should include block diagrams, schematics, code listings, photos, etc.) There will also be a brief (5-10 minute) demonstration.

You must use the course web site to register your group members and submit the project documents.

Project Requirements

While there are no strict rules, this course is about digital design and your project should include some digital logic design rather than being only software-based.

The level of complexity, as measured in lines of code, number of modules, number of peripherals, etc. should be roughly equal to all of the labs put together.

Publishing

In accordance with BCIT Policy 5101-PR1, [Implementation of Student Regulations](#), your abstract, proposal and final report will be submitted as “digital copies of student work to the BCIT Institutional

Repository at the BCIT Library.” To allow this you must fill out form [LIB-73](#) and upload it along with your final report. This form grants the BCIT Library permission to distribute these documents under a CC-BY-NC-ND [Creative Commons](#) license.

These documents may *not* include personal information such as your BCIT ID, e-mail address, etc.; confidential information; or copyrighted material except as permitted under “fair use” exemptions.

Previous years’ project reports are available on-line at the [BCIT Institutional Repository](#).

Hardware

Each pair of students will be loaned one of the Intel (formerly Altera) DE0 Nano FPGA boards for the duration of the project. You may use the lab components (keypad, joystick, display, etc) in your project as well.

You may also use additional components. Up to US \$50 worth of components per group (including shipping and other fees) may be ordered through BCIT. These components must be turned in at the end of the course for possible use in future courses. You may keep any parts you obtain yourself.

The course website has links to some useful suppliers but components may be purchased elsewhere.

To reduce the administrative overhead, parts will be ordered immediately after the proposal due date. Most parts should then be available for the first project lab. However, orders from some suppliers can take three weeks or longer. Factor this into your planning.

Project Lab Time

Approximately half of the lab sessions will be set aside for the instructor to help students with their projects. However students will need to do most of the project work on their own time.

You should partner with someone in your own lab set so that you can work together during the scheduled lab sessions. You should also partner with someone who wants to invest the same level of effort into the project (bare minimum versus maximum effort).

Groups who do not “check in” by attending scheduled lab sessions may be asked to demonstrate that they are making progress.

Marking

The project will be marked as follows:

Originality (10%) will be based on the degree of similarity to previous projects (at BCIT and elsewhere). This includes the originality of the problem, the solution and the implementation. Students are expected to find and reference similar work. Failure to do so will be penalized.

Achievement (70%) will be computed as the level of complexity and the fraction of the project objectives achieved. The level of complexity is relative to the amount of effort (lines of RTL and software, number of peripherals, etc.) compared to that of all the labs combined. Redundancy, unnecessary complexity and damage to components will be penalized.

Documentation (20%) Based on the abstract (15%), proposal (25%), report (50%) and demonstration (10%). The standard expected is that of similar courses at other schools.

Since your achievement mark is a function of both complexity and degree of completion, do not choose a trivial project nor one that you will be unable to complete.

You can minimize your risk by structuring your project as a primary objective together with optional features that can be completed if you have time.

Exams

Exams will be “open book” and will allow any books or notes but no electronic devices other than a calculator.

Exams will primarily test your ability to convert Verilog to/from schematics, and solve short design problems.

Software

We will be making extensive use of Quartus Prime for synthesis and the associated version of ModelSim for simulation. If you have a computer you will find it useful to install some of this software. The course website has links to, and information about, this software.

Comments

As a minimum, each source file (Verilog or C) must include near the start of the file a comment that includes: the file name, a line describing the purpose of the file, the author's name and the date.

Additional comments next to port and signal declarations and for non-obvious portions of your design are also a good idea.

Attendance and Absences

I recommend, but do not require, attendance at lectures. Students who do not attend lectures must check the course web site regularly to stay informed of changes to the course. You may want to use the "Notifications" feature on the web site's News section to get timely updates.

You must attend a lab to get credit for completing it.

If you were unable to complete an assignment, lab, report or exam due to illness, please submit a [Student Medical Certificate](#) to [Kelly Voros](#) who will then notify the instructors of the courses affected.

There are many good reasons for absences. However, it is impractical and inequitable for me to decide which ones merit special consideration. My policy is therefore not to make allowances for absences other than as required by BCIT policy.

Lecture Notes

There is no textbook for this course. Lecture notes will be handed out before each lecture and also posted on the course web site along with solutions to the exercises. Additional resource material including a textbook chapter, language standards, board and software manuals and component datasheets will be posted on the course web site.

Most lectures will include exercises that will be completed during the lecture. There isn't enough space to complete the exercises on the handouts so you should bring blank paper or a notebook to class where you can take notes and work out the answers to the exercises.

Document Preparation and Submission

Document File Formats

Much of your professional work will involve working with electronic documents. The consequences of preparing a document in the wrong format can be serious. In this course you will be asked to submit assignments and lab reports in specific file formats. *If you submit an assignment or lab report in the wrong file format you will receive a mark of zero for that submission.*

Just as important as the file format is making sure your document is submitted to the correct dropbox and that it is readable. After uploading your submission, check that you've used the correct dropbox and then download your submission to make sure it was properly uploaded and is readable.

Creating PDF Files

Many word processors (including the free [LibreOffice](#)) will export to PDF files. There are also free utilities such as [FreePDF](#) that allow you to "print" any document to a PDF file.

If you prefer to write your labs and assignments by hand you can scan them and convert them to PDF. If you have a smart phone with a camera you can use various apps to photograph and convert your handwritten assignments to PDF. If you embed photos in a word processor document, please rotate, crop and scale them appropriately.

Please make sure the documents you submit are readable. Grayscale scans are usually easier to read than two-level.

Cover Pages and Templates

Assignment and lab/pre-lab reports *must* include the following on the front, preferably on a separate cover page: the course number and name, the lab or assignment number and title, your name and BCIT ID, and the date the document was created.

However, *project documents* (abstract, proposal and report) should **not** include your BCIT ID or other personal information as this would preclude their publication.

You may find it helpful to create a document template that you can re-use for future submissions.

Submission

All assignments, pre-labs and lab reports are to be submitted to the “Dropbox” section on the course web site.

You may use any file name for your document. Don't add comments when submitting your documents as I won't see them. You must click “Submit” after uploading your file. Check that your document can be downloaded and is readable. You should receive an e-mail confirmation; save it.

Submissions may be collected anywhere from a few minutes to a few weeks following the submission deadline. If you have not submitted your file(s) to the correct dropbox when I collect them you'll receive a mark of zero for that submission.

You'll be able to update assignments and lab reports until the time I collect them. So if you're not finished by the deadline I recommend submitting the incomplete version and updating it later if you get a chance.

Note:

- 1. If you do not submit an assignment or lab report in the required file format I will not download it or read it and you will receive a mark of zero for that submission.**
- 2. You must submit the document *in PDF format* unless another file format is specified.**

The web site will not warn you if you submit a file in the wrong format.

For practical reasons, no marks can be given for reports or assignments submitted to the wrong dropbox.

These policies will seem harsh when you get no credit for something you've spent much effort on. Unfortunately, they're necessary in order to run the course efficiently and fairly.

Marking

A detailed marking scheme will be published on the course web site under “Course Information” along

with your encrypted marks. Each student will be e-mailed a password they can use to view their own marks.

Marked assignments and reports will be uploaded back to the Dropbox section of the course web site and will be available in the “feedback” column. Typically each comment indicates an error for which a mark was deducted. Not all items in each report will be marked.

Copyright and Plagiarism

Throughout your career you will use the work of others. This introduces two different risks: copyright infringement and plagiarism.

Whenever you use the work of others you should ask yourself two questions:

- Am I allowed to copy this material? This question is answered by Canadian copyright law and determines whether you would infringe copyright.
- Do I need to cite a source for this idea? This question is answered by BCIT's policy on academic integrity and determines whether you would commit plagiarism.

Copyright law forbids copying others' work without permission although there are certain exceptions. In addition to the “fair dealing” exemptions, BCIT belongs to [Access Copyright](#) which gives you permission to copy and download material from many publishers.

Plagiarism means taking credit for the work of someone else. Briefly, you must reference the source of an idea if there's a possibility a reader could mistake it as your own.

You are expected to comply with these laws and policies. The BCIT Library has introductory material on [copyright](#) and [avoiding plagiarism](#).

Academic Integrity

In this course, assignments, labs and exams are to be done individually. Students are encouraged to seek help from classmates but copying is not allowed. Instances of plagiarism will be reported to the Associate Dean and dealt with according to BCIT policy

5104 (“Sanctions range up to and including suspension from the institute.”).

Here are some guidelines for this course:

Don't:

- divide up the questions on an assignment or work together on solutions
- submit a modified copy of someone else's solution
- ask to look at someone else's solution or show someone else your solution, not even in rough form
- write out a solution for someone else, not even on a white board

Do:

- help someone else arrive at their own solution by asking them leading questions
- explain your interpretation of the question (but not the solution)
- explain material found in the lecture notes or other references
- share books, papers or links to useful reference material – unless finding this material is part of the assignment
- compare your final numerical results – but only if each person has arrived at their answer independently; any discrepancies must be resolved independently

Briefly, if a classmate asks for help, help them find their own solution, do not show them yours. When copying is detected I can't tell who copied from whom and all students involved will be penalized.

Assignments, labs and exams may be set up in a way that allows plagiarism to be detected. This may not be obvious to you.

Your mark will also depend on your ability to follow instructions and pay attention to details. Students often fail to notice important details and lose marks for things such as giving a very complete and detailed answer to a different question, submitting in a different file format (.doc, .zip) than the one requested, or doing the work and then submitting it late or not at all.