# APSC 160 Course Outline

**Calendar Description**

Analysis and simulation, laboratory data acquisition and processing, measurement interfaces, engineering tools, computer systems organization, programming languages.

**Course Description**

You'll learn to write your own programs in the programming language called C. In particular, you'll learn about software design principles with a focus on engineering problem solving. You'll also learn some elementary data analysis using Microsoft Excel and will learn how to exchange data between a C program and Excel. It is likely that you will continue to use C and Excel following the completion of this course; therefore, the concepts and practical aspects that you learn throughout the term will continue to be of value to you. The C compiler and development software that we use is free, and can be installed on your home computer or laptop.

**Prerequisites**

None.

**Exemption or Transfer Credit due to a Prior Post-Secondary Programming Course**

If you have already received credit for a post-secondary (beyond high school) programming course in C or C++, you may not be able to take APSC 160 for credit. If you have already completed such a course, please go to Engineering Student Services (ground floor, Kaiser building) to see if you can be exempted from (i.e., don't have to take) this course. If you have credit for UBC's old CPSC 111 (Java) course, and you are in Applied Science, then you will be exempted from APSC 160 with approval from Engineering Student Services. If you have credit for UBC's CPSC 110, please consult Engineering Student Services to determine if APSC 160 is still required for your program.

**Changing Sections**

If you would like to switch lecture sections or lab sections, you must see Engineering Student Services, as soon as possible. Note that changes to registration are normally made only in cases where there is a conflict with another course. Please note that instructors in this course do not have the ability to change student registrations.

**Tentative Schedule of Topics**

Week 1  Introduction, Computer Systems, Compilers
Week 2  Variables, Assignment, Primitive Data Types, Expressions, Precedence, Associativity, I/O, printf, scanf, Libraries, Function Calls
Week 3  Flow Charts, Boolean Expressions, Branching
Week 4  Looping, Testing, and Debugging
Week 5  File I/O, Modularity, Programmer Defined Functions, Parameters, Scope, Lifetime
Week 6  Programmer Defined Functions (cont.)
Week 7  Programming with Arrays, Functions that Process Arrays
Week 8  Programming with Two-Dimensional Arrays
Week 9  Introduction to Data Analysis with Excel
Week 10 Hardware/Software Interfacing Data Acquisition Module

Week 11  Simple I/O: reading switches, writing LEDs writing to 7-segment display
Week 12  Data Acquisition: reading analog inputs
Week 13  Additional Examples

Note: This schedule is intended to provide a guide to the topics covered in this course. The ordering of topics may be changed by the instructor.

**Lectures**

The Computer Science department will teach the first 8 weeks of the course, and the Electrical and Computer Engineering department will teach the last 5 weeks of the course.  Your instructors are:

- Section 101: Dr. Paul Carter (pcarter@cs.ubc.ca) and Dr. Paul Davies (pauld@ece.ubc.ca)
- Section 102: Dr. Ali Madooei (madooei@cs.ubc.ca) and Dr. Paul Davies (pauld@ece.ubc.ca)
- Section VE2: Dr. Celina Berg (cgberg@cs.ubc.ca) and Dr. Antonio Sanchez (antonios@ece.ubc.ca)

Please include "APSC 160" in the subject line of any course-related emails to help us filter them.  Please note that questions regarding labs or marking should be sent to your TA (see the Section on Lab Schedule and TAs which we will post once the TA assignments stabilize).

**Required Textbook**

The textbook for this course is:  *Programming in C*, 4th edition, by Stephen Kochan, Addison-Wesley, 2014.

The previous textbook used for this course, *Engineering Problem Solving with C*, 4th edition, by Delores Etter 2012, is acceptable in place of the Kochan book.

An earlier edition of either of these two books is also OK, but you are responsible for finding the appropriate part of the book that deals with the topics currently being studied in the lecture.

You can use one of these textbooks as a reference during your lab's programming tests; other books or notes are not allowed. Our recommendation is the Kochan textbook, which is available for purchase at the UBC Bookstore or at the Discount Textbook store just off campus in the University Village (about one block southeast of University Boulevard and Wesbrook Mall, above the Starbucks on Dalhousie Road). The following reading rooms/libraries have a copy of the Etter textbook for short-term: (a) Ike Barber Library Reserve Room (two-hour loan, one copy on order), and (b) Computer Science Reading Room (2nd floor of the ICCS building, beside MacLeod's Electrical Engineering building; two copies on one-day loan).  Note that Ike Barber has extended hours, including weekends.  You may wish to buy your own copy, especially if you plan to do programming after the course ends.

In addition, there's a free package of worksheets: APSC 160: In-Class Worksheets. You can download that package through Canvas. Bring the current worksheet to your lectures, since we'll be working on that set.

**iClickers**

If you don't already have one for your other courses, you'll need to get an iClicker device. A new clicker costs about $45, and is available from either the UBC Bookstore or Discount Textbooks. An iClicker allows you to earn marks by answering questions posed by the instructor during class. Questions are

delivered on the projection screen in class, and instructors can collect and display the aggregate responses from the class. Please remember to **register** your clicker on Canvas by clicking on the iClicker menu on the LHS of the Canvas screen and remember to bring your clicker to every class. If you don't register or forget to bring the clicker to class, you will lose grades.

## Canvas

UBC Canvas is an e-learning tool that acts as a repository for course notes, policies, labs, etc.—and provides you with useful tools such as the screencasts (videos), worksheets, practice labs, sample solutions, sample exams (with solutions), and a list of your grades in the course. You will be introduced to Canvas in your first lab, but feel free to browse around before then. You should already have a CWL account but if you don't, you can obtain one free of charge by visiting http://www.cwl.ubc.ca. You'll use this account frequently at UBC, and you'll need it to log on to the lab's computers in CEME 2212.  If you have a laptop with a wireless network card, a CWL account will also provide you with free access to UBC's wireless network:  we recommend you always connect to the secure wireless network (named ubcsecure) whenever you are on campus.  After you log on to Canvas, click on the APSC 160 course link to gain access to the course material. Your grades are viewable only by you and course staff.  Canvas is available 24 hours per day, weekends included ... except for possibly short, maintenance outages.  Some of your other courses may also use Canvas.

The *Current Announcements* linked from the Home Page is required reading for this course. You should plan to read it regularly, preferably every day.

## Grading Scheme

| | |
|---|---|
| BitFit Prelecture Questions | 2% |
| Clickers | 3% |
| In-class Exercises | 3% |
| Labs (best 8 of 9) | 18% |
| Midterms | 25% |
| Final Exam | 49% |

The instructor reserves the right to modify this grading scheme during the term as necessary.

Note 1: We'll start using the clickers for marks during your second class. Anyone found responding to clicker questions on behalf of another student will receive a grade of zero for the clicker portion of the course. If you wish to earn these marks, you must attend the whole class and participate. For each clicker question, half the marks will be for participation and half will be awarded for the correct answer. To allow for unexpected things like sickness, going to the dentist, family emergencies, missing the bus, sleeping in, having a bad day, etc., we'll only count your best 90% of the participation grades. Your participation grade is actually made up of three parts: the *pre-lecture* BitFit exercises, the clicker questions and the in-class exercises. For the latter, you'll be asked to submit a page for one of the in-class exercises that we did in class. The actual page to be turned in will be determined by the instructor, near the end of class. If your work for the given question spans more than one page, hand in the additional page(s).  Important: Be sure to put your student number (name optional) on the page that you turn in!  You will not get this page back; so, in case you want to refer to it in the future, you may wish to take a picture of it with your cell phone; or else you may wish to buy a carbonless copy notebook (like the Hayden-McNeil lab notebooks that some Chemistry courses use) at the UBC Bookstore, in

which case you should hand in the copy. Then, you can keep the original. Please note that we will NOT accept e-mail copies of your work.

Note 2: We will drop your worst lab mark. This allows for illness, dentist, family emergencies, missing the bus, etc. ... or if you happen to miss the programming lab submission deadline. The latter inevitably happens to some students when they don't submit their program in time. Be sure to pay attention to your TA's instructions! 15 minutes to the hour (near the end of your lab) is the deadline for uploading your program to Canvas.

Note 3: In order to pass the course you must:

- obtain an overall grade of at least 50%
- obtain a grade of at least 50% on the final exam
- obtain an overall grade of at least 50% on the (best 8 out of 9) labs.

If you fail to satisfy either of the last two conditions, a final grade that is no greater than 45% will be assigned.

**Midterms**

Midterm 1: October 9, 2018, Time 19:00-20:30, Location TBD

Midterm 2: October 31, 2018, Time: 18:30-20:00, Location: TBD

If you have a conflict with either of the scheduled midterms (e.g., you have another class or exam in the same time slot), please contact your instructor *immediately*. For midterm marking appeals, please see the instructions on the course discussion board; and let us know by the stated deadline about any such errors.

**Final Exam**

The final exam will be scheduled by Enrollment Services. Exam schedules are normally released in mid-October. Please do not make any holiday travel plans until this schedule is released. Note that the last day of final exams this term is Wednesday, December 19, 2018. For the date/time/location of the exam, and your other final exams, check the Student Service Centre (SSC).

The final examination is a closed book exam. No calculators, books, or notes are allowed; The exam coverage includes all materials that were discussed in the course (screencasts, lecture notes, related textbook sections, in-class exercises, pre-labs, labs, ...). There will be no question on Excel on the final exam.

**Missed Examination**

If you are unable to write the midterm due to illness or other extenuating circumstance, you must contact your instructor as soon as possible (and within 24 hours) to avoid a zero on the exam. Do not wait until the next class. It is sufficient to send your instructor a short e-mail message to say that you will be unable to attend the exam. In the case of illness, a medical note from your doctor will be required.

Students seeking academic concession due to absence from the *final* exam for any reason must apply to Engineering Student Services (ESS) within 72 hours of the missed exam. This is a standard practice for all final examinations at UBC.

For more information, see: http://students.engineering.ubc.ca/enrolment/faq/Links to an external site.

Missed Lab

If you are unable to attend your lab for any reason, then a grade of zero will be entered for that lab.  Please note however, that we only consider your **best 8 out of 9 labs** when computing your overall lab grade, to allow for situations like illness, dental appointment, missed bus, funeral, etc.  Be sure to do the practice lab, even if you are going to miss the upcoming lab!  In fact, we recommend that students do all 9 labs, if possible, since that will help prepare you for the final exam, and give you some solid programming experience that may be important in years to come.

Please do not ask to swap labs or to make up the lab at another time as this cannot and will not be accommodated due to the complexity of setting up the lab's time-controlled drop boxes.

**Academic Misconduct**

Don't cheat!  The academic enterprise is founded on honesty, civility, and integrity. As members of this enterprise, all students are expected to know, understand, and follow the codes of conduct regarding academic integrity. (You agreed to these rules of conduct upon being admitted to UBC.)  At the most basic level, this means submitting only original work done by you and acknowledging all sources of information or ideas, and attributing them to others as required. This also means you should not cheat, copy, or mislead others about what is your work. Violations of academic integrity (i.e., misconduct) lead to the breakdown of the academic enterprise, and therefore serious consequences arise and harsh sanctions are imposed. For example, incidences of plagiarism or cheating may result in a mark of zero on the assignment or course component, and more serious consequences may apply at the discretion of the Dean's office or the President's Advisory Committee on Student Discipline. Furthermore, careful records are kept to monitor and prevent recurrences.

In this course, academic misconduct can occur in any of the following ways: copying part of someone else's code on an assignment, lab test, or exam; allowing someone to copy your code, in whole or in part, electronically or manually; viewing someone else's code on a computer screen and then copying it into your own code; allowing someone to view your code; sharing your UBC account (including giving away your password); hiring a tutor to write part of, or all of, the code; using two iClickers (e.g., a friend didn't go to the lecture, but you have decided to cheat for them); etc. Please note that this list is not exhaustive, it is merely intended to provide you with some concrete examples.

Please be aware that both the person who copies and the person who allows their work to be copied are subject to penalties. The penalty for plagiarism can be suspension from the University, a grade of zero for the course, and a note on your transcript. (This has happened to students in this course or in other computing courses.)  Don't do it! It's really not worth it.

All students should read and be familiar with the following section of the UBC Calendar: http://www.calendar.ubc.ca/vancouver/index.cfm?tree=3,286,0,0Links to an external site.

**Religious Holidays**

Students who are scheduled to attend classes or write examinations on holy days of their religion are permitted to absent themselves from class or examination provided they give at least two week's notice to the instructor. For more details on this policy, please see UBC Policy #65: Religious Holidays.