Course Outline

Instructor:
A: Bruce Wallace MC6015 wally@sce.carleton.ca

Course Objective:
Introduction to engineering problem solving. Defining and modeling problems, designing algorithmic solutions, using procedural programming, selection and iteration constructs, functions, arrays, converting algorithms to a program, testing and debugging. Program style, documentation, reliability. Applications to engineering problems; may include numerical methods, sorting and searching.

Learning Outcomes:
By the end of this course students should be able to
1) identify the data/inputs/assumptions, and the objectives of the problem from the description
2) evaluate arithmetic and logical expressions
3) execute a set of instructions (flowchart or pseudo-code, or C++) with assignments, selection, conditional and loop statements including functions and arrays.
4) implement C++ programs
5) modify and correct C++ programs

Instructional Resources:
- Students are responsible for all information posted on the course web site. Information regarding the course will be updated regularly throughout the term. Students should check the web site at minimum in advance of every lecture and lab session.
- Required Textbooks:
  - Problem Solving with Computers, Bryant, Marshall, Wallace. This is published by the student IEEE society and will be available for purchase from the IEEE office (ME4238).
  - Carleton University ECOR 1606 Summer 2017: Programming in C++ E-book will be used for assignment problems through-out the term. A copy of this is mandatory otherwise; no credit for the assignment portion of the course will be possible. It can be purchased from Zybooks at the following URL after Apr 16, 2017. You must have the Summer 2017 version! NO course credit will be granted from previous term versions! If you have previously purchased a copy of Zybooks, contact zybooks support (support@zybooks.com) as they typically provide discounts to renew for a course repeat.
    - Sign up at http://www.zyBooks.com
    - You MUST use your @email.carleton.ca or @uottawa.ca Email address.
    - Enter zyBook code CARLETONECOR1606WallaceSummer2017
    - Click Subscribe
- Further Reading:
  - Texts: There are a large number of introductory C++ programming texts available. Some are better than others but in general any such text will serve the student who wants a "second opinion". One good possibility is Engineering Problem Solving with C++ by Delores M. Etter and Jeanine A. Ingber (Pearson Prentice-Hall).
  - Web resources: There are a large number of C and C++ programming resources on the web. Specific links will be provided as the term progresses but http://www.cplusplus.com is a very complete resource that we will use regularly in lectures.

Grading Scheme:
Lab Exams: 45%  (Early Feedback Exam 5%, Lab Midterm 10%, Lab Final 30%)
Written Exams: 50%  (Midterm 10%, Final 40%)
Assignments: 5%  (Zybooks)
Academic Integrity:

From the Academic Integrity Policy (found http://www.carleton.ca/sasc/academic-integrity/)

“Carleton University is a community of scholars dedicated to teaching, learning and research. Sound scholarship rests on a commitment to a code of academic integrity that stresses principles of honesty, trust, respect, fairness and responsibility. The University demands integrity of scholarship from all of its members including students. The quality and integrity of academic work is paramount in achieving student success.

The University states unequivocally that it demands academic integrity from all its members. Academic dishonesty, in whatever form is ultimately destructive to the values of the University. Furthermore, it is unfair and discouraging to those students who pursue their studies honestly. The integrity of university academic life and the degrees conferred by the university is dependent upon the honesty and soundness of scholarship. Conduct by any person that adversely affects this process is a serious matter. Students who violate the principles of academic integrity through dishonest practices undermine the value of the Carleton degree. Dishonesty in scholarly activity cannot be tolerated. Any student who violates the standards of academic integrity will be subject to appropriate sanctions.”

Students should be aware of their obligations with regards to Academic Integrity (refer to the Academic Integrity Policy for additional details).

Plagiarism:

Marks are conditional upon students being able to explain their work if asked to do so. **Students who are strangely unfamiliar with what is supposedly their own work will have their marks adjusted accordingly.** Plagiarism (copying and handing in for credit someone else's work) is a serious instructional offense that will not be tolerated. Please refer to the section on instructional offenses in the Undergraduate Calendar for additional information.

Examinations:

There will be **three** laboratory exams (an early feedback exam, a lab midterm, and a lab final) and two written tests (a midterm and a final). In the laboratory tests students will use computers. In the written tests students will answer questions on paper. The midterm will be held during class time on **Tuesday May 23rd**. The final will be held during the University’s examination period. It is for evaluation purposes only and will not be returned to students. The laboratory exams will take place on the dates indicated on the lab schedule. All exams will be closed book. Students will, however, be supplied with standard reference sheets.

Section 2.5.1 of the Undergraduate Calendar will be applied to all exams within this course: Students are expected to assess their medical situation/ability to write an examination prior to entering the examination room. Students are expected to complete an examination once begun. If a student experiences a significant deterioration of her/his health while the examination is in progress. Please note, any significant deterioration during an exam is a situation whereby the student requires immediate and/or emergency medical attention. In such circumstances, a student will be required to seek appropriate documentation to confirm that the medical situation caused significant, acute symptoms during the examination that completely prohibited the student from completing the exam, describing the specific impacts on the student's ability to continue the exam.

Students who miss an exam will receive a mark of zero unless they have a legitimate reason for being absent and provide appropriate documentation dated within **one day** of the exam and presented to their instructor **within 3 days** (photo by Email acceptable). In this case the weight of the missed exam will normally be transferred to the following exam of the same type (e.g. the weight of the written midterm will be transferred to the written final). The lab final is a mandatory course element and students that do not write this exam will receive a final mark of ABS. Special arrangements will apply in the case of the lab final. Only students who miss the lab final and provide appropriate documentation will be permitted to write a make-up lab final. Those who miss the make-up lab final will be given a final grade of ABS. Make-ups will be during one of the other lab sections if possible. A make-up will be scheduled (only if needed) on or after the last day of classes.
Carleton University
Department of Systems and Computer Engineering

ECOR 1606 A  Problem Solving & Computers  Summer 2017

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Students are required to write exams in their registered lecture or lab section. Students must have Instructor permission in advance to write an exam with another section.

There is to be complete silence during all exams. The only questions permitted concern typographical errors in the exam paper. All other questions—what is expected for the answer, or how to interpret a problem—are not permitted. If you are unsure about a question, you are to state an assumption that does not contradict the exam paper, and answer accordingly. (Please read: Item 10 of Examination Regulations, http://carleton.ca/ses/exams/examination-procedures/examination-regulations/)

Assignments:
Assignments will be posted on the web site as the course progresses based on the student activities within the Zybooks Ebook text. All assignments will be completed on-line within the web text resource and must be completed before midnight on the last day of classes in the term per undergraduate academic year. Please do not ask for exemptions and/or extensions as you have the complete term to complete these tasks. Grading is automated within the web resource and will be based on successful completion of the tasks.

Students MUST ensure that they clearly identify themselves (exactly same name as used by Carleton and their @cmail.carleton.ca or @uOttawa.ca Email address) within the on-line text to ensure credit is received for assignments. Credit will only be granted to the student identified through the provided Email address.

To achieve full credit for assignments, a student must complete 70% of the assigned tasks (ie 70% complete as reported by Zybooks) for each of the chapters of the textbook covered in the course. Students that complete more than 70% will receive pro-rated bonus credit for this work (ie to a max of 7/5 if 100% of all chapters completed) only if at least 70% of the tasks within each of the assigned chapters is completed. The textbook contains significant additional material (shown as optional) that is not covered in ECOR 1606. Students are welcome to complete this for extended learning but NO credit for this material will be awarded.

Midterm Bonus: Students that have completed at least 70% of the assigned tasks for each of Zybooks chapters 1 through 4 before the written midterm (deadline 11:59pm Monday May 22nd) will receive a bonus of 1 for their assignment mark. Allowing a potential 8/5 grade on assignments when combined with the term end mark. This Midterm Bonus is an all or nothing mark with no partial award so students receive either 1 or 0. No extensions will be granted.

Do not conclude that, because the assignments are “only” worth 5% of your final mark, they are not worth doing. Doing the assignments is one of the best way of acquiring the skills that you need to pass this course.

Problem Sets

There will be additional OPTIONAL problem sets posted roughly every 2 weeks throughout the term. These provide students with additional opportunity to apply the course materials. Solutions will be provided at the same time as the subsequent problem set.

Programming and Problem Solving is a language-learning process and thought-process skill and this is best achieved through employing the skills and language in the same way that immersion is the best way to learn a second language. The problem sets provide an opportunity to solve problems and create programs.

Labs

There are weekly labs, starting on Thursday May 4th. Normally, students will complete a practical programming exercise during their scheduled three-hour lab period. The programming exercises will focus on one particular aspect of programming. Programming and problem solving are both practical skills that are only learned through practice. The Tutorial labs provide the opportunity for students to develop their skills with the support of the TA team.
Some lab periods will alternatively be used to conduct lab exams. Lab exams will be similar to regular lab exercises, but exam conditions will prevail, namely: each student will individually prepare and submit their own solution with no talking or electronic communication allowed.

Lab Schedule:
There are 11 labs. Labs #3, #7 and #11 are lab tests.

<table>
<thead>
<tr>
<th>Lab</th>
<th>Topic</th>
<th>Week starting</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tutorial (selection and iteration)</td>
<td>May 4</td>
</tr>
<tr>
<td>2</td>
<td>Tutorial (using C-- )</td>
<td>May 9</td>
</tr>
<tr>
<td>3</td>
<td>Early Feedback Test</td>
<td>May 11</td>
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<tr>
<td>4</td>
<td>Tutorial (Dev C++ Debugger)</td>
<td>May 16</td>
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<tr>
<td>5</td>
<td>Tutorial (The Dev C++ Environment)</td>
<td>May 18</td>
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<tr>
<td>6</td>
<td>No lab this week (in class midterm)</td>
<td>May 23</td>
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<tr>
<td>7</td>
<td>Lab Midterm</td>
<td>May 30</td>
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<tr>
<td>8</td>
<td>Tutorial (Function Intro)</td>
<td>Jun 1</td>
</tr>
<tr>
<td>9</td>
<td>Tutorial (Functions)</td>
<td>Jun 6</td>
</tr>
<tr>
<td>10</td>
<td>Tutorial (Arrays)</td>
<td>Jun 8</td>
</tr>
<tr>
<td>11</td>
<td>Lab Final</td>
<td>Jun 13</td>
</tr>
</tbody>
</table>

Week-by-Week Course Plan:
This is intended only as a general guide to what will be covered and is subject to change.

<table>
<thead>
<tr>
<th>Lecture</th>
<th>Material</th>
<th>Text (Bryant et al.)</th>
<th>Text (Zybooks)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction to course, selection and iteration</td>
<td>Ch 1</td>
<td>Ch 1</td>
</tr>
<tr>
<td>2</td>
<td>Selection and iteration, Programming in C--</td>
<td>Ch 1; Ch 2</td>
<td>Ch 1 - 4</td>
</tr>
<tr>
<td>3</td>
<td>Programming in C--</td>
<td>Ch 2</td>
<td>Ch 1 - 4</td>
</tr>
<tr>
<td>4</td>
<td>Selection and iteration in computer programs</td>
<td>Ch 3</td>
<td>Ch 1 - 4</td>
</tr>
<tr>
<td>5</td>
<td>More examples, multi-way if, do while</td>
<td>Ch 3</td>
<td>Ch 3,4</td>
</tr>
<tr>
<td>6</td>
<td>Moving from C-- to C++, midterm exam</td>
<td>Ch 4</td>
<td>Ch 4</td>
</tr>
<tr>
<td>7</td>
<td>C to C++, breaks, for loops</td>
<td>Ch 4; Ch 5</td>
<td>Ch 4</td>
</tr>
<tr>
<td>8</td>
<td>Output formatting</td>
<td>Ch 5</td>
<td>Ch 5, 8.1-8.3</td>
</tr>
<tr>
<td>9</td>
<td>Functions</td>
<td>Ch 6</td>
<td>Ch 6</td>
</tr>
<tr>
<td>10</td>
<td>Functions, Arrays</td>
<td>Ch 6; Ch 7</td>
<td>Ch 6,7</td>
</tr>
<tr>
<td>11</td>
<td>More arrays</td>
<td>Ch 7</td>
<td>Ch 7</td>
</tr>
<tr>
<td>12</td>
<td>Input/output (input errors, reading from files)</td>
<td>Ch 8; Ch 9</td>
<td>Ch 8.4-8.5</td>
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</tbody>
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Students with Disabilities:
The Paul Menton Centre for Students with Disabilities (PMC) provides services to students with Learning Disabilities (LD), psychiatric/mental health disabilities, Attention Deficit Hyperactivity Disorder (ADHD), Autism Spectrum Disorders (ASD), chronic medical conditions, and impairments in mobility, hearing, and vision. If you have a disability requiring academic accommodations in this course, please contact PMC at 613-520-6608 or pmc@carleton.ca for a formal evaluation. If you are already registered with the PMC, contact your PMC coordinator to send me your Letter of Accommodation at the beginning of the term, and no later than two weeks before the first in-class scheduled test or exam requiring accommodation (if applicable). Requests made within two weeks will be reviewed on a case-by-case basis. After requesting accommodation from PMC, meet with me to ensure accommodation arrangements are made. Please consult the PMC website.
(http://www.carleton.ca/pmc) for the deadline to request accommodations for the formally-scheduled exam (if applicable).

Note that for this course, MEC accommodations make use of the highest demand facilities in the MEC and because of the special tools (CMM/DevC++) require extra effort from MEC staff to run. Students must indicate to the Instructor their intention for lab tests as many students prefer to do their lab tests in the lab with the other students. We need to release the MEC facilities to other students if they are not going to be used.

Email Communication:
As required by University regulation, students are required to consistently read their Carleton email. The instructors will be using this email account to communicate important and timely messages. Not reading these emails is not a valid excuse for missing a deadline or any other course related announcement.

Emails to the instructors must be professional in nature and in writing. All emails must be from the student’s Carleton account. The title must contain the course name. The body must contain the student’s name, student number, and, if applicable, lab and/or lecture section.
Example Title: ECOR1606 A – Midterm

The instructors attempt to answer all emails in a timely and helpful manner, within two working days. Replies will not be sent to emails concerning matters already covered in class, or posted on the course website or class wide emails.

Health and Safety:
Every student should have a copy of our Health and Safety Manual. An electronic version of the manual can be found at http://www.sce.carleton.ca/courses/health-and-safety.pdf