Instructor:
Professor J.R. Green, P.Eng., room 6203CB, e-mail jrgreen@sce.carleton.ca (Please send from your email account and include “SYSC2001” in the subject line to ensure a response.)

Office hours: By appointment. See course web site for additional hours.

Instructional Hours per Week:
- Lectures 3 hours per week: Tuesdays & Thursdays 14:35-15:55 in ??
- Laboratory 2 hours per week: Room ??

Prerequisites:
ECOR 1606 OR SYSC 1102 OR SYSC 2006 (SYSC 2006 may be taken concurrently)

Students who have not satisfied the prerequisites for this course must either: a) withdraw from the course, b) submit a prerequisite waiver online at http://www.sce.carleton.ca/ughelp, or c) may be deregistered from the course after the last day to register for courses in the Fall 2017 term.

Textbook:

Note that earlier editions (6,7,8) can be used instead although chapter problem numbers may differ slightly.

Text Coverage: Chapters 1, 3 – 5, 7, 9 – 12

Additional course notes and references may be distributed on the course web page to supplement the text.

Web Page:
The course web page can be located on CULearn. Students are required to check this page often for course updates. Supplementary lecture notes will be posted there for student use. Note that reading the supplementary lecture notes only is NOT ENOUGH to pass this course! The single best predictor of student performance is attendance at lectures and labs.

Other References:
• Additional materials may be made available on the course website.

Grading Scheme:

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labs</td>
<td>20%</td>
</tr>
<tr>
<td>In-Class Midterm Tests</td>
<td>30%</td>
</tr>
<tr>
<td>Final Exam (scheduled 3 hours, closed-book)</td>
<td>50%</td>
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Labs:

There will be ten graded labs (all labs are graded except for Lab0). Lab dates, pre-lab and materials will be made available on the course web page. Attendance at labs is important and absolutely necessary to obtain a good grade. TAs will be available during all lab sessions to help students.

The computer lab is open whenever the building is open. You may use the lab at any time, except for those time slots when the lab is reserved for others.

It is expected that each person do their own work on both the prelab and in-lab components. Students will be randomly questioned about their lab submissions during the labs, and must be able to explain features of their solution in order to receive the marks.

Each lab will be worth up to 3 marks as follows:

- 0 = did not show up or did not try or clearly just copied someone else's solution
- 1 = showed up, worked hard but did not achieve any of the key lab objectives
- 2 = showed up, tried hard, got something close to a working solution that they can explain
- 3 = showed up, got working solution, produced well-documented intelligible code, and can explain the solution.

Bonus marks may be available for some labs...

Mid-Term Test:

There will be two mid-term tests (15% each, closed-book, no calculators permitted) held at the scheduled class time roughly scheduled for week 5 (October 12th) and week 11 of the term (November 23rd).

Important Notes:

1) Students must pass the Final Examination Paper (50% or higher) in order to pass the course. (i.e. Failing to pass the Final Examination results in an F grade for the course). The final examination is for evaluation purposes only and will not be returned to the students.

2) Students are expected to attend all lectures and labs. If a student is absent from a lecture, it is up to the student to obtain missed lecture material from colleagues in the course.

3) Students who miss a test or lab due to illness must provide a valid medical certificate to the instructor not later than 48Hrs after returning to campus. The certificate must clearly state the name of the doctor with contact information, the date & time that you were seen, the time of onset, the degree of incapacitation, and the expected recovery date. Once the certificate has been verified, the
test weight will be added to the final examination weight, or the missed lab weight will be added to the other lab weights.

4) **Academic Accommodation.** You may need special arrangements to meet your academic obligations during the term because of disability, pregnancy or religious obligations. Please review the course outline promptly and write to me with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist.

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 (www.carleton.ca/pmc) for the deadline to request accommodations for the formally-scheduled exam (if applicable).

5) **Plagiarism** (e.g. copying and handing in for credit someone else's work) is a serious instructional offence that will not be tolerated. Please refer to the section on instructional offences in the Undergraduate Calendar for additional information.

6) **Deferred Exams.** Students who miss the final exam may be granted permission to write a deferred examination (see the Undergraduate Calendar for regulations on deferred exams). To be considered for a deferred exam, *satisfactory performance during the term* requires obtaining a grade of at least 50% on both the midterm and lab components of the course.

7) The final exam (closed book, no calculators permitted) will be held during the University's formal examination period in December. The Final Examination is for evaluation purposes only and will not be returned to the student.

**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](http://www.sce.carleton.ca/courses/health-and-safety.pdf)

**Tentative Outline of Topics:**

**Week 0-1** Ch. 1, Ch. 2 (*very briefly*)
- admin details, discuss handout, introduction
- system bus model
- introduction to ASM language programming and lab tools

**Week 2-3** Data representation (ASCII, integers), Ch 9, Appendix A

**Weeks 4-7** Ch. 3, Ch 10 (plus - Appendix 10B on endian and bit order), Ch 11, Ch 12
- assembly language programming cont.
- instruction fetch/execute, interrupts, I/O
- instruction set characteristics, operands and types of operations
- endian schemes and bit ordering
addressing modes and instruction formats
processor organization, register organization, instruction cycle, instruction pipelining
relationship of architecture and organization to high-level language
control structures, built in data types, functions/subroutines, parameter passing

**Week 8** Ch. 3 continued (plus - appendix 3A on timing diagrams)
bus interconnection structures, simple timing diagrams
interrupts

**Week 9** Ch. 7
external devices, disks, I/O modules
programmed I/O, interrupt driven I/O and DMA

**Week 10** finish Ch. 9
IEEE floating point representation and arithmetic

**Week 11** Ch. 4
memory system characteristics, memory hierarchy, intro to cache memory
cache memory design: size, mapping, replacement, write policy, number
internal memory types, organization

**Week 12** Ch. 5, Review
error correcting memory
DRAM: synchronous, cache