Instructor: Eran Ukwatta, CB 6202, 613-520-2600 ext. 2963, ukwatta@sce.carleton.ca
Office Hour: Thursday 12-1 pm

Course Description and Objectives:
• To introduce students to common programming techniques/algorithms (recursion, searching and sorting, etc.)
• To introduce students to several fundamental abstract data types (ADTs) and data structures. Students will learn how to develop the specifications for ADTs, design their underlying data structures, and implement the ADTs as Java classes. Some common applications of these ADTs will be presented.
• To introduce students to techniques for designing and analyzing algorithms

Learning Outcomes:
• Gain ability to intuitively analyze the complexity of basic algorithms
• Gain ability in choosing the appropriate data structures and algorithms for a given application

Course Outline (by Topic):
• Introduction
• Recursion
• Data Abstraction
• Example Abstract Data Type: Linked Lists
• Problem Solving with Recursion
• Stacks
• Queues
• Algorithm Efficiency/Complexity
• Sorting
• Trees
• Tables and Priority Queues
• Advanced Tables: Hashing
• Graphs

Prerequisites:
Precludes additional credit for SYSC 2002 and COMP 2402.
Prerequisite(s): (SYSC 1102: C++ Programming or SYSC 2006: Foundations of Imperative Programming) and (SYSC 1101 or SYSC 2004: Object-Oriented Software Development).

Textbook (highly encouraged to have this book):

Other Reference Textbooks (great for additional reading):
Carleton University  
Department of Systems and Computer Engineering  

SYSC 2100  Algorithms and Data Structures  Winter 2018  

Course Outline

  ISBN: 978-1-118-77133-4

- *Algorithms 4th Edition* by Authors: Robert Sedgewick and Kevin Wayne  

I recognize that textbooks are expensive, so a (used) version of the textbook (either the 3rd or the 2nd edition) may work as well. I encourage you to acquire a copy of the textbook early in the term, as the bookstore will not carry them beyond the initial few weeks of classes.

Course Delivery

I will use cuLearn for managing course interactions, grades, as well as assignment submissions.

Laboratory Sessions:

A 2-hour weekly lab period has been scheduled, but formal lab sessions will normally not be held at that time. Supplementary lectures or tutorials or the midterm exam may be scheduled for some of the lab periods on an as required basis; these will be announced in class.

Students can use the undergraduate computer labs whenever the Mackenzie Building and Minto CASE are open, except for those times when labs are reserved for specific courses.

Attendance:

Students are expected to attend all lectures and be able to attend the lab periods as required. The Faculty of Engineering and Design requires its students to have a conflict-free timetable, so requests to accommodate missed exams, assignment due dates, etc., because of conflicts with other courses, jobs, or vacation plans will not be considered.

Assignments and Exams:

Students will be evaluated by means of 5 assignments, a midterm exam, and a final exam. There will be a total of 5 programming assignments. Doing the assignments is the best way to learn the course material, so students are encouraged not to “write off” any particular assignment just because of its relative low weight in the overall grading scheme. In addition, completing a subset of the assignments will be a pre-requisite for being allowed to write the final exam. Late assignments will not normally be accepted, and will receive a mark of 0; however, students who cannot submit an assignment by the due date for valid medical or compassionate reasons should contact the instructor immediately and prior to the due date to arrange for appropriate accommodations (e.g., an extension of the due date). Arrangements must be made in a timely manner, otherwise the assignment will be considered late and not accepted. Note that assignments will be submitted using cuLearn, using the cuLearn server cut-off time. However, all assignments can be submitted multiple times, so I encourage you to submit an early version.

Students are encouraged to discuss design issues when working on assignments; however, you are expected to write your own programs. There is a fine line between cooperating with your classmates (discussing problems and ideas) and copying program code (plagiarism). Not only is plagiarism an instructional offense (see the current Undergraduate Calendar, Academic Regulations of the University, Section 14), but doing the assigned work by
yourself is by far the best way to prepare for the exams. Note that it is not only an instructional offence to submit someone else’s work as your own. It is also an instructional offence to knowingly allow someone else to hand in your work as his/her work.

You are encouraged to ask the TA(s) for feedback and suggestions for improving your Java programs. When you ask a TA to help you with one of your programs, you will be expected to present a well-documented listing of your program. The TA(s) may be unable to provide much assistance of all you can show is an undocumented, difficult-to-understand program.

The quiz and midterm exams will be held in-class. Quiz and midterm exam papers will be returned to the students. Reevaluations may be considered based on specific requests by you, but will be performed without your presence. Students who are unable to write the exam because of illness or other circumstances beyond their control must provide evidence. In the case of illness, this requires a medical certificate dated no later than one working day after the exam. The certificate must specify the date of the onset of the illness, the (expected) date of recovery, and the extent to which the student was/is incapacitated during the time of the examination. If this information is provided to the instructor no later than three working days after the exam, the marks for the quiz will be transferred to the midterm; a deferred midterm may be offered to the student. Otherwise, the mark for the missed exam will be zero.

Final Exam: Is for the evaluation purposes only and will not be returned to the student. The final exam will be held during the University’s formal examination period. For SYSC 2100, only students who completed at least four out of five programming assignments are eligible to write the final examination or, where circumstances warrant, apply to the Registrar’s Office for deferral of the final exam. Completed means any assignment mark greater than 0 (note that in case of confirmed cases of plagiarism, the usual penalty is to be awarded zero on an assignment). In case of deferral, the following rule will apply:

Students who miss the final exam may be granted permission to write a deferred examination (see the Undergraduate Calendar for regulations on deferred exams).

Grading Scheme and Schedule:
To pass the course, a student must pass the final examination (D- or better). For these students, the marks will be calculated as follows:

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Weight</th>
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<tbody>
<tr>
<td>Assign. 1</td>
<td>25%</td>
</tr>
<tr>
<td>Assign. 2</td>
<td>5%</td>
</tr>
<tr>
<td>Assign. 3</td>
<td>5%</td>
</tr>
<tr>
<td>Assign. 4</td>
<td>5%</td>
</tr>
<tr>
<td>Assign. 5</td>
<td>5%</td>
</tr>
<tr>
<td>Quiz</td>
<td>5%</td>
</tr>
<tr>
<td>Midterm</td>
<td>20%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>50%</td>
</tr>
</tbody>
</table>

The complete schedule of assignments, exams, and their weights are listed in the following table (programming assignments are due at noon on their deadline day – but you are welcome to submit them earlier):
Carleton University
Department of Systems and Computer Engineering

SYSC 2100  Algorithms and Data Structures  Winter 2018
Course Outline

All assignments are due at 11.55 pm. Please note that both the midterm and final exams will be closed book.

Plagiarism:
Plagiarism (copying and handing in for credit someone else's work, as well as allowing someone else to copy your own 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.

Copyright of course material
“Classroom teaching and learning activities, including lectures, discussions, presentations, etc., by both instructors and students, are copy protected and remain the intellectual property of their respective author(s). All course materials, including PowerPoint presentations, outlines, and other materials, are also protected by copyright and remain the intellectual property of their respective author(s). Students registered in the course may take notes and make copies of course materials for their own educational use only. Students are not permitted to reproduce or distribute lecture notes and course materials publicly for commercial or non-commercial purposes without express written consent from the copyright holder(s).” Statement from the office of the Provost and Vice-President (Academic).

Guide to Academic Accommodations

Pregnancy obligation: 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. For more details visit the Equity Services website: http://www.carleton.ca/equity/

Religious obligation: 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. For more details visit the Equity Services website: http://www.carleton.ca/equity/

Academic Accommodations for 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 (www.carleton.ca PMC) for the deadline to request accommodations for the formally-scheduled exam (if applicable).

You can visit the Equity Services website to view the policies and to obtain more detailed information on academic accommodation at http://www.carleton.ca/equity/