

MTE 140
Algorithms and Data Structures
Spring 2012

General Information:

Instructor: Alexander Wong E2-1303D (a28wong@engmail.uwaterloo.ca)

TAs: Robert Amelard (ramelard@uwaterloo.ca), Eric Hunsberger (ehunsberger@uwaterloo.ca), Tameem Hesham (thesham@uwaterloo.ca), and Abhishek Kumar (a42kumar@uwaterloo.ca)

Text: Wong et al., ``Data Structures and Algorithms in a Nutshell". 2012.

575 Home Page: www.einfodaily.com/piTunez/mte140.htm

Class Times: M Tu Fri 9:30AM-10:20AM EIT 1015

Laboratories: Th 2:30PM-4:20PM CPH 1346

Office Hours: TBD

Course Description:

The course emphasizes the topics of structured software design, data structures, abstract data types, recursive algorithms, algorithm analysis and design, sorting and searching, hashing, and problem-solving strategies.

Course Objectives:

At the end of the course you should be able to:

- Explain the principles of fundamental algorithms and data structures.
- Apply learnt algorithms and data structures in practical programming exercises using the C++ language.
- Understand the usefulness of algorithms and data structures in a wide range of fields involving embedded programming such as robotic controllers, health monitoring systems, and navigation systems.

Course Grading:

1. Homework problems will be assigned from time to time but will not be graded. Solutions to homework problems will be presented during tutorials.
2. Four computer labs will be assigned during the term, emphasizing different algorithms and data structures that is complementary to concepts discussed in course material. The labs will be undertaken in groups of two students. 25% of the course grade will be based upon the submitted lab code. Labs will be submitted via UW-ACE by midnight of the due date. Late labs will have 25% of the lab mark deducted for each day or part of a day that the lab is late.
3. The midterm is worth 25% of the course grade.
4. The final exam is worth 50% of the course grade.

Course Outline:

1. Introduction and Math Review
2. Linked Data Representations
3. Recursion
4. Algorithm Analysis
5. Lists, Stacks, and Queues
6. Trees
7. Graphs
8. Sorting
9. Hash Tables

Note on Plagiarism and Cheating:

Both plagiarism and cheating during the course will not be tolerated. Students found cheating or plagiarizing

will be given a minimum of zero percent (0%) for the exam or assignment in question. Please refer to Policy 71 on student academic discipline.

Academic Integrity:

In order to maintain a culture of academic integrity, members of the University of Waterloo community are expected to promote honesty, trust, fairness, respect and responsibility. [Check www.uwaterloo.ca/academicintegrity/ for more information.]

Grievance:

A student who believes that a decision affecting some aspect of his/her university life has been unfair or unreasonable may have grounds for initiating a grievance. Read Policy 70, Student Petitions and Grievances, Section 4, www.adm.uwaterloo.ca/infosec/Policies/policy70.htm. When in doubt please be certain to contact the department's administrative assistant who will provide further assistance.

Discipline:

A student is expected to know what constitutes academic integrity [check www.uwaterloo.ca/academicintegrity/] to avoid committing an academic offence, and to take responsibility for his/her actions. A student who is unsure whether an action constitutes an offence, or who needs help in learning how to avoid offences (e.g., plagiarism, cheating) or about "rules" for group work/collaboration should seek guidance from the course instructor, academic advisor, or the undergraduate Associate Dean. For information on categories of offences and types of penalties, students should refer to Policy 71, Student Discipline, www.adm.uwaterloo.ca/infosec/Policies/policy71.htm. For typical penalties check Guidelines for the Assessment of Penalties, www.adm.uwaterloo.ca/infosec/guidelines/penaltyguidelines.htm.

Appeals:

A decision made or penalty imposed under Policy 70 (Student Petitions and Grievances) (other than a petition) or Policy 71 (Student Discipline) may be appealed if there is a ground. A student who believes he/she has a ground for an appeal should refer to Policy 72 (Student Appeals) www.adm.uwaterloo.ca/infosec/Policies/policy72.htm.

Note for Students with Disabilities:

The Office for Persons with Disabilities (OPD), located in Needles Hall, Room 1132, collaborates with all academic departments to arrange appropriate accommodations for students with disabilities without compromising the academic integrity of the curriculum. If you require academic accommodations to lessen the impact of your disability, please register with the OPD at the beginning of each academic term.