Algorithm Analysis and Development

Prerequisites: A grade of C$^-$ or better in CPSC 100, CPSC 101, CPSC 141, and CPSC 142; or permission of instructor.

Instructor: Dr. David Casperson; **Office:** Library 471; **Phone:** 960-6672; **Departmental Administrative Assistant:** Diane Mikkelsen; **DAA's Phone:** 960-4690; **e-mail:** casper@unbc.ca .

Lecture times: M W F   9:30–10:20. **Room**: 5-124. There are *no* assigned lab or tutorial times.

Text Book: [4] is required for this course. Do not buy the first edition.

References: [1] is an excellent C⁺ resource book, and I'll refer to it for material on templates and the standard library. In this regard [3] is definitive, but harder to read. [2] is difficult reading, but contains a wealth of information on list data-structures, algorithmic analysis and sorting algorithms.

Grading Scheme:

Homework:	25%	
Midterm 1:	20%	Wed, Oct 12
Midterm 2:	20%	Fri, Nov 4
Final Exam:	35%	3h in 5–16 Dec

I reserve the right to change the weight of any portion of this marking scheme. If changes are made, your grade will be calculated using the original weighting and the new weighting, and you will be given the higher of the two.

Programming Assigments: There will be approximately four medium-sized programming assignments during the semester. Familiarity with C⁺ is assumed.

Syllabus: Much of the material is from *Weiss*, in particular Chapters 2–4 and 7, with other material as time permits. I shall also cover material from Chapters 12, 13, 19, and 20 of *Deitel and Deitel*.

Topics include:

- Algorithm analysis and asymptotic complexity (2 weeks).
- Loop variants, loop invariants, and recursive programming (1 week).
- Templates, the Standard Template Library, containers, iterators, and generic programming in C⁺ (2 weeks).
- Sorting algorithms (2 weeks).
- Error handling and exceptions (1 week).
- List classes (1 week).
- List based classes: stacks, queues, and deques (1 week).
- Tree classes (1 week).

Times are approximate.

Cheating: First offenses result in a grade of $-100\,\%$ on the assignment in question and formal notification of the College Dean. Allowing someone to copy your work is cheating. The UNBC Calendar describes academic offenses and possible penalties in more detail.

References

[1] Harvey M. Deitel and Paul J. Deitel, *C⁺, How to program*, fifth ed., Prentice Hall, 2005, Other editions equally good.

[2] Donald E. Knuth, *Sorting and searching*, second ed., The Art of Computer Programming, vol. 3, Addison-Wesley, 1998.

[3] Bjarne Stroustrup, *The C⁺ programming language*, third ed., Addison-Wesley, 1997.

[4] Mark Allen Weiss, *Data structures and algorithm analysis in C⁺*, second ed., Addison-Wesley, 1998.

[5] Patrick Henry Winston, *On to C⁺*, Addison-Wesley, 1994.