

Mathematics & Computer Science

Computer Science 4625 –Design and Analysis of Advanced Algorithms Course Outline – Winter 2025

LECTURES:	Wed/Fri 12:00 pm – 1:45 pm	ROOM: M1060			
INSTRUCTOR:	Robert Benkoczi (office C556) robert.benkoczi@uleth.ca				
TEXTS:					
	- Algorithm Design, by Kleinberg and Tardos, 2006, Ch. 8 (main resource).				
	 Parallel Algorithms, by M. Ghaffari, Jan. 2019 (main resource), https://people.csail.mit.edu/ghaffari/CHParallel18.pdf. 				
	 Thinking in parallel, by Uzi Vishkin, notes, 2010 (highly recommended), http://users.umiacs.umd.edu/~vishkin/PUBLICATI ONS/classnotes.pdf 				
	 Introduction to parallel algorithms, by G. Blelloch, L. Dhulipala, and Y. Sun, (optional) https://www.cs.cmu.edu/~guyb/paralg /paralg/parallel.pdf. 				
	Brief lecture notes from the University of Toronto, (optional) http s://www.eecg.toronto.edu/~ece1762/hw/par.pdf				
CRADING	Assignments (approx 5)	95%			
SCHEME:	Project	25% 15%			
	Exam 1 (Feb 14)	30%			
	Exam 2 (final)	30%			

GRADE DISTRIBUTION: This information is provided as a guideline only and may be revised in this offering.

A+	95	B+	77	C+	67	D+	55
A	85	В	73	C	63	D	50
A-	80	B-	70	C-	60	F	< 50

SCHEDULE:

(as time permits):

- 1. Problem complexity, classes P, NP, and NP-complete problems (Ch 8, Kleinberg and Tardos).
- 2. Parallel models of computation.
- 3. Parallel algorithms for list ranking, sorting, connected components, bipartite matching.
- 4. Massively parallel algorithms for sorting, connected components, maximal matching, and maximal independent set.

COMMENTS:

- Work must be submitted at the scheduled time. In case of emergencies, contact your instructor to enquire about the possibility of obtaining an extension. Missed tests and assignments receive 0 points.
- Requests for remarking tests and assignments are accepted only in writing no later than one week from the date your graded work was returned. On the request: identify the assignment or midterm, briefly explain why you believe the mark is incorrect. You can send your request by e-mail. Note that if your work is remarked, your grade may go up, down, or remain unchanged.
- Copying is strictly prohibited. Plagiarism can lead to severe penalties please consult the student discipline policy at https://www.uleth.ca/policy/resources/student-discipl ine-policy-academic-offenses-undergraduate-students

LINKS

- Moodle: http://moodle.uleth.ca/
- Instructor's page including office hours: http://www.cs.uleth.ca/~benkoczi/