

University of Lethbridge
Department of Mathematics and Computer Science

Computer Science 4625 –Design and Analysis of Advanced Algorithms
Course Outline – Fall 2021

LECTURES: Tu Thr 12:00 – 13:15 **ROOM:** B756 and online on MSTeams

INSTRUCTORS: Robert Benkoczi (office C556)
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TEXTS: *Introduction to the theory of computation*, by Sipser, 3rd Ed., Ch. 7-9
Parallel Algorithms, by M. Ghaffari, Jan. 2019, <https://people.inf.ethz.ch/gmohsen/CHParallel18.pdf>.

GRADING SCHEME:	Assignments	25%
	Project	25%
	Final exam	50%

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	B	73	C	63	D	50
A-	80	B-	70	C-	60	F	< 50

SCHEDULE:

(as time permits):

- 1) Time complexity, classes P, NP, and NP-complete problems (Ch 7, Sipser).
- 2) Space complexity. PSPACE-complete problems (Ch 8, Sipser).
- 3) Parallel models of computation.
- 4) Parallel algorithms for list ranking, sorting, connected components, bipartite matching.
- 5) Massively parallel algorithms for sorting, connected components, maximal matching, and maximal independent set.

COMMENTS:

- Students must obey the university policies concerning the wearing of masks and maintaining distance, during labs and lectures. The instructors reserve the right to interrupt the delivery of the lectures or labs if these policies are violated.
- Despite the delivery of in person instruction, this semester continues to be challenging. Students should consult the resources in place that support their program, <https://www.ulethbridge.ca/campus-life/student-services>
- Lectures are delivered in class. Every effort is made to also stream the lectures on MS Teams and to record them, in order to support students who cannot come to class.
- Course materials and grades are uploaded on Moodle. Use MSTeams to post questions and to attend lectures online.
- Work must be submitted at the scheduled time; no provision is made for make-up midterm or late assignments, except for medical reasons or emergencies. 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-discipline-policy-academic>. Any code submitted for grading will be checked for plagiarism using MOSS <https://theory.stanford.edu/~aiken/moss/>.

LINKS

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