

University of Lethbridge
Department of Mathematics and Computer Science

Computer Science 4110/5110/7110 – Advanced Algorithms in Facility Location
Course Outline – Fall 2024

LECTURES:	Mon Wed 15:00 – 16:45	ROOM: AH175
INSTRUCTOR:	Robert Benkoczi (office C556) robert.benkoczi@uleth.ca	
TEXTS:	Reading will be assigned from academic papers and a selection of chapters from “Algorithm Design” by Kleinberg and Tardos, to review notions of complexity theory.	
GRADING SCHEME:	Final exam	40%
	Midterm	20%
	Assignments (approx 5)	25%
	Project	15%

GRADE DISTRIBUTION: This information is provided as a guideline only and may be revised in this offering. Minimum percentages for each letter grade are:

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

TOPICS:

(as time permits):

- 1) What is facility location? Examples, problem complexity, easy problem instances and simple algorithms. Introducing p -median, p -center, and covering problems.
- 2) Advanced algorithmic approaches for exact solutions of facility location problems in special networks: dynamic programming, prune and search, searching in sorted matrices, parametric optimization.
- 3) Useful data structures: centroid decomposition of tree graphs, spine decomposition (maybe).
- 4) Applying the algorithms to different variations of facility location problems such as geometric facility location, locating obnoxious facilities, facility location with uncertain information.

COMMENTS:

- 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, date and sign. 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-acad>