Geographic Information Systems (GIS)

Instructor:	**Lab Instructor:**
Bradley A. Wilson	Mr. Jason Freeburn
Office: RC-2006A	Office: RC-2004
bwilson@lakeheadu.ca	jtfreebu@lakeheadu.ca

Dr. Wilson's
Office Hours: Tues: 10-11:15pm and 1-2:25pm
                        Wed. and Fri: 10-11:15am
                        Thurs: 10-11:15pm and 1-2pm

Course Description and Objectives:

The course is intended to provide you with some experience of how to represent various types of spatial data in the form of visual displays which more readily communicate information than raw data. In addition you will be given grounding in GIS principles and techniques to spatial data analysis that can lead to further study in this useful field.

Specific Objectives are to:

* learn the underlying principles of GIS database construction;
* develop a working knowledge of ArcGIS software;
* learn to diagnose and manage errors associated with GIS database construction; and
* learn common spatial data analysis techniques.

Course Grading:

• Lab exercises	30%
• Lab exam (last week of classes during lab time)	10%
• Midterm #1 (Friday Feb. 1)	15%
• Midterm #2 (Wed. Mar. 6)	15%
• Final Exam (TBA)	30%
	100%

The lab exercises are to be submitted electronically to Mr. Freeburn and/or the Teaching Assistant (gis2232@lakeheadu.ca) in accordance with the instructions provided at the first lab period. Overdue labs will be penalized by 10% per academic day or part thereof.

Course Organization:

> *Lectures:*   Wednesdays & Fridays 11:30-12:20 in RC-2003
> *Lab (section W1):*   Thursdays 2:30 - 5:20, in AT-3009
> *Lab (section W2):*   Tuesdays 2:30 - 5:20, in AT-3009

There will be two 50-minute lectures each week, portions of which will be preparation for the 3-hour laboratory period. Students must be registered in one of the 2 lab sections. Lab sessions will focus on practical exercises to learn specific operations available in GIS software and to clarify lecture concepts. A complete schedule of planned topics is found below. The content from lab sessions will be tested in the four exams (3 exams and lab test).

No formal division of the class into groups will be made for labs or assignments, though it is acknowledged you will likely work together at times. Individual (and unique) submissions are expected for each lab exercise and assignment. I expect you to read and understand the University's policy on plagiarism (see University policy on "Code of Student Behaviour and Disciplinary Procedures").

Course Resources:

- (***required text***): Chang, K., *Introduction to Geographic Information Systems*, 5th to 8th edition is fine (New York, NY: McGraw-Hill).

- (***required***): USB device for data storage and for submission of assignments

These items are available in the bookstore. Readings from the required text are to be assigned throughout the term.

Accessing Lakehead's Computer Labs:

Access to LU's computer labs and course datasets (including those for this course) is gained with your LU-issued e-mail log in ID and password. Be sure to **select "AD" (Active Directory)** for choosing the location to log on to. Data and additional instructions for lab exercises will be located in the Geog 2232 'course folder' that is found in the K:/ sub-directory. When working with datasets and creating new data, **save all files to a USB device** or as advised by the Lab Instructor. Files saved to the DeskTop will be lost in the event of a computer re-boot or crash. Save files frequently with ArcGIS and similar software.

Instructor Expectations:

You are expected to be present in lectures since much of the material is directly relevant to the lab exercises, assignments and tests. Attendance at labs will be recorded and will be reviewed when assigning final course grades. All lab exercises are to be drafted according to instructions received from the Lab Instructor.

Week	Lecture Topics	Assigned Readings
1	Introduction	Chang: chapter 1
	Databases	Chang: chapter 8
2	Coordinate Systems and GPS	Chang: chapter 2
3	Spatial Data Models	Chang: chapters 3 and 4
	Issues with Spatial Data Models	
4	Midterm review	
	MIDTERM #1 – Feb. 1	
5	Raster Data Models	Chang: chapter 4
6	Vector Data Models	Chang: chapter 3
	Editing Spatial Data	
	Study Break	
7	Editing Spatial Data (cont.)	Chang: chapter 7
	Midterm Review	
8	**MIDTERM #2 – Mar. 6**	
	Overlay Analysis	Chang: chapter 11.2
9	Vector Analysis	Chang: chapter 11
	Terrain Analysis	Change: chapter 13
10	LIDAR	
	Raster Data Analysis	Chang: chapter 12
11	Surfaces and Interpolation	Chang: chapter 15
	Buffer Operations	Chang: chapter 11.1
12	Least Cost-Pathway Analysis	Change chapter 17
	Final Exam Review	