

## Geographic Information Systems (GIS)

**Instructor:**

Bradley A. Wilson  
Office: RC-2006A  
[bwilson@lakeheadu.ca](mailto:bwilson@lakeheadu.ca)

**Lab Instructor:**

Mr. Jason Freeburn  
Office: RC2004  
[jtfreebu@lakeheadu.ca](mailto:jtfreebu@lakeheadu.ca)

Student consultation hours as posted on respective office doors.

**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. At the end of this course you will be more sensitive to the value of a cartographically sound map and will have been initiated into the world of GIS.

**Specific Objectives:**

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

**Course Grading:**

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|---|------------|
| • Lab exercises                                   | 30%        |
| • Lab exam (last week of classes during lab time) | 10%        |
| • Midterm #1 (Thurs. Jan. 27)                     | 15%        |
| • Midterm #2 (Tues. Mar. 9)                       | 15%        |
| • Final Exam (TBA)                                | <u>30%</u> |
|   | 100%       |

**Your ability to communicate clearly and concisely in written form are crucial components of your overall evaluation in this course. Clarity, grammar, and punctuation are all requirements for good communication in the written form. Poor writing styles such as point form are unacceptable in this class.**

**All exams are cumulative.**

Absences from illness, compassionate reasons or representing the university off-campus, supported by written documentation, will be accepted as sufficient evidence to allow a re-write

of a missed test or an extension on an assignment. **Missed tests for any other reason, including undocumented illness, may be made up at a date and place to be determined. This make-up test will consist of full-length essay questions and will be significantly longer and harder than the original.**

The lab exercises are to be submitted electronically to Mr. Freeburn and/or the Teaching Assistant ([gis2232@lakeheadu.ca](mailto: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:**

<i>Lectures:</i>	Mondays and Wednesdays 2:30-3:20 (in BB-2006)
<i>Lab (section L1):</i>	Mondays 8:30 - 11:20, in AT-3009
<i>Lab (section L2):</i>	Thursdays 2:30 - 5:20, in AT-3009

There will be two 50-minute lectures each week, portions of which will be partial 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.**

### **Course Resources:**

- (**required text**): Chang, K., 2014. *Introduction to Geographic Information Systems*, 7<sup>th</sup> Edition (New York, NY: McGraw-Hill), 425 pages with companion CD
- (**required**): USB data storage device for submission of assignments

These items are available in the bookstore or Campus Tech. 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 either a USB device or on the N:/ sub-directory** 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.

**GEOG 2232 COURSE SCHEDULE** (*subject to changes*)

<b>Week of:</b>	<b>Lecture Topics</b>	<b>Readings</b>
Jan. 4	Introduction Databases	Chang: chapter 1
Jan. 11	Map Projections	Chang: chapter 2.1-2.3
Jan. 18	Coordinate Systems Data Models in GIS (Intro)	Chang: chapter 2.4-2.5
Jan. 25	Issues with Spatial Data Models <b>MIDTERM #1 – Jan. 27</b>	
Feb. 1	Raster Data Models	Chang: chapter 4
Feb. 8	Vector Data Models	Chang: chapter 3
Feb. 15	<i>READING WEEK</i>	
Feb. 22	Acquisition of Spatial Data	Chang: chapter 5
Feb. 29	Editing Spatial Data	Chang: chapter 7
Mar. 7	<b>MIDTERM #2 – Mar. 9</b> Overlay Analysis	Chang: chapter 11.2
Mar. 14	Vector Analysis Terrain Analysis	Chang: chapter 11 Chang: chapter 13
Mar. 21	Raster Data Analysis	Chang: chapter 12
Mar. 28	Buffer Analysis Cost Pathway Analysis	Chang: chapter 11.1 Chang: chapter 17