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GEOG 2232 Introduction to Geomatics and Geographic Information Systems
Department of Geography and the Environment
Fall 2024

Instructor Information
    Instructor: Dr. Muditha Heenkenda
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Lab Instructor Information
    Instructor: Mr. Jason Freeburn
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    Office Hours: TBA

Teaching Assistant (TA) Information

    TBA

Course Identification
    Course Number: GEOG 2232
    Course Name: Introduction to Geomatics and Geographic Information Systems
    Course Location: RC 2003 & ATAC 3009
    Class Times: Lec. M/W 11.30 am-12.30 pm; Lab Friday 2.30-5.30 pm
    Prerequisites: None

Course Description/Overview - An introduction to applied mapping and Geographic Information System (GIS) theory and applications. Emphasises understanding of how geospatial features are represented and captured as data, and how these data can be managed, analyzed, and presented using state-of-the-art GIS tools. Introduces main uses of remotely sensed imagery, Global Satellite Navigation Systems, and mobile mapping techniques. Hands-on experience with state-of-the-art software—ESRI's ArcGIS Pro. Organizes Lakehead GIS Day parallel to International GIS Day to showcase student achievements and promote real-world GIS applications.

Course Learning Objectives

Upon successful completion of this course, students will be able to:
- identify and compare different GIS data models and convert between vector data models as needed;
- create, import, manage, explore, analyze and display geospatial data using ESRI's ArcGIS Pro software;
- create maps and reports which communicate thematic information, applying basic cartographic principles to improve map layouts;
- compare coordinate system and datum used in geographic data, set and convert spatial reference systems, and correctly utilize project-on-the-fly to represent your data on a map layout;
- interpret basic remote sensing imagery data to answer questions related to natural resource management, including an assessment of accuracy and error;
- apply GIS theory and concepts to answer spatial questions; and
- describe the essential components and architecture of a commonly used commercial GIS software.

Course Resources

Course Website:
- D2L site will be activated at the beginning of the semester. D2L site is the centralized location to share all course materials, including lecture slides, labs, data, quizzes, discussion forums and exams.

Required Course Text(s)
- **Required**: Chang, Kang-tsung. 2019. Introduction to Geographic Information Systems (9th edition). McGraw Hill Education.

Available for a 6 month rental period:
https://www.mheducation.com/highered/product/introduction-geographic-information-systems-chang/M9781259929649.html

Hardware requirements:
Lab exercises are based on ESRI ArcGIS Pro software package that requires specific hardware. ATAC 3009 lab is equipped with the necessary hardware and software.

Using ArcGIS Online organizational credentials, students can install the software on their personal computers to work outside lab hours. Hardware requirements:
https://pro.arcgis.com/en/pro-app/latest/get-started/arcgis-pro-system-requirements.htm

Course Schedule/Outline

Date (week of)	Monday	Wednesday	Lab (Friday 2.30 -5.30)	Reading
Sept 2	No classes (Labour Day)	Course Introduction & Introduction to GIS	Lab1: Exploring various web mapping applications and geospatial data sources Create a data management plan for the course	Chapter 1
9	Intro to GIS Theory, terms and concepts Web mapping	Introduction to GIS data models Vector data model	Lab 2: GIS file management, introduction to ArcMap Pro and ArcCatalog	Chapters 1 & 3
16	Introduction to Remote Sensing – aerial photographs, satellite images	Raster data model, raster data catalogues	Lab 3: Working with raster data	Chapter 4
23	Introduction to Cartography, basic map elements, create a simple map	Spatial reference systems	Lab 4: Datums, map projections and coordinate systems	Chapter 2
30	**No classes**	Midterm test 1 review	Introduction to the GIS Day project	
Oct 07	**Midterm test 1**	Cartography – typography/ Vector and raster data display – qualitative and quantitative	Lab 5: Qualitative and quantitative data display methods and map-making	Chapter 9
14	*Fall Study Break*			
21	Georeferencing raster images	GIS Data capture and working with tabular data, join and relates	Lab 6: Georeference an image, add vector data and create a map	Chapters 5 & 6
28	Data exploration – select by attributes, select by location etc.	Midterm test 2 review GIS Day poster	Lab 7: Working with GIS/GPS data – onscreen digitizing, editing, map making	Chapter 8
Nov 4	Spatial data quality and spatial analysis	**Midterm test 2** GIS Day poster	Lab 8: Joins and relates, attribute queries, summary tables	Chapter 10
11	Spatial analysis tools – overlay, buffer, intersect	Raster data analysis – simple operations (extract, resample)	Lab 9: Spatial data analysis (GIS case study)	Chapter 11
18	GIS Day poster	**GIS Day**	Lab 10: Raster data analysis	
25	Introduction to GPS– GIS/GPS integration	Mobile data acquisition & integration to GIS	Lab 11: Configuring mobile apps, data capturing, downloading and map making	Chapter 5
Dec 2	Final exam review	No classes (the last day of instructions is Tuesday, Dec 3, 2024)		

Note that this document is subject to change pending unforeseen circumstances.

Assignments and Evaluations

Item	Date(s)	Value
In-class Assignment(s)	Every week before the next lab	45%
Mid-Term Tests (2)	Test 1: Oct 7, 2024 Test 2: Nov 6, 2024	20%
GIS Day poster	Nov 18, 2024	15%
Final Examination	TBA	15%
GIS Data/file management	Dec 3, 2024	5%
Total		100%

Late Assignments

Late Assignments receive a deduction of 10% per day unless an extension is agreed to with the instructor before the due date. After class assignments are graded and returned, late assignments receive a zero grade but **must be** satisfactorily submitted to complete the course.

Course Policies

- Attendance is expected for each lecture and lab unless communicated with the instructor ahead of time.
- Participation is expected in all class discussions and collaborative efforts (GIS Day).
- For the behavioural standards please refer to the Code of Student Behaviour and Disciplinary Procedures, also known as The Code.
- Exams (a) absences from illness, compassionate reasons or representing the university off-campus, supported by written documentation, will be accepted as sufficient evidence to allow a rewrite of a missed test.

  (b) If you miss an exam for any reason other than those deemed acceptable in the Lakehead University calendar, then you will be given the opportunity of an essay-based makeup exam that is significantly longer and more difficult.

Regulations – General Information from the Academic Calendar

  "It is the responsibility of each student registered at Lakehead University to be familiar with, and comply with all the terms, requirements, regulations, policies and conditions in the Lakehead University Academic Calendar. This includes, but is not limited to, Academic Program Requirements, Academic Schedule of Dates, University and Faculty/School Policies and Regulations and the Fees and Refund Policies and Schedules."

Collaboration/Plagiarism

Plagiarism is defined in [University Regulation IX](#) with additional examples in Article I, Section 1 of The Code. Sanctions associated with Academic Misconduct are defined in Article II of The Code and Enforcement Procedures are outlined in Article III of The Code.

Students wishing to learn more about Academic Misconduct are encouraged to read the [University and relevant Faculty Regulations](#) and The Code (noted above) and access other resources on the [Teaching Commons](#) website.

University Policies – all University Policies can be found [here](#). Pay particular attention to those found under the Category of "Regulations" and "Student-Related". If you have a question, please let me know by email or in-class. If you have a question, it is likely that at least a few others in the class are wondering the same thing.

ChatGTP & Other AI Tools

Students wishing to learn more about using ChatGTP and other AI tools in class should refer to this [link](#).

Supports for Students – there are many resources available to support our students. These include but are not limited to:
- [Health and Wellness](#)
- [Student Success Centre](#)
- [Student Accessibility Centre](#)
- [Library](#)
- [Academic Support Zone](#) (Writing and Math Tutoring Centre)

Lakehead University is committed to achieving full accessibility for persons with disabilities. Part of this commitment includes arranging academic accommodations for students with disabilities and/or medical conditions to ensure they have an equitable opportunity to participate in all of their academic activities. If you are a student with a disability and think you may need accommodations, you are strongly encouraged to contact Student Accessibility Services (SAS) and register as early as possible. For more information, please contact Student Accessibility Services http://studentaccessibility.lakeheadu.ca (SC0003, 343-8047 or sas@lakeheadu.ca)

Additional Information

- Please communicate with your lab instructor about using ATAC 3009 out of lab hours
- Each lab assignment is attached to a lab report rubric on the D2L site.