Advanced GIS & Spatial Analysis

Geography 4211 – Winter 2017

Course Description:

This is an advanced course in the applications of geographic information systems and spatial analysis. The course will be delivered through a combination of lectures, seminar discussions, student presentations and laboratory work (see Schedule). Students will continue to develop their working expertise of ArcGIS along with other software packages.

Instructors:

The course in Winter 2017 will be jointly delivered by a team of instructors. The specific content and sequencing of the sessions has been developed to take advantage of the varied expertise amongst the instructional team. For consultation outside of designated class times, students should approach the respective instructor to which the specific coursework pertains; otherwise inquiries of a general or logistical nature should be directed to the Chair of Geography who will also act as the lead coordinator.

Instructor	Office	email
Dr. Rob Stewart**	RC-2006E	rob.stewart@lakeheadu.ca
Dr. Adam Cornwell	RC-2006D	adam.cornwell@lakeheadu.ca
Mr. Jason Freeburn	RC-2004	jason.freeburn@lakeheadu.ca
Mr. Reg Nelson	RC-2001	rjnelson@lakeheadu.ca
Dr. Brad Wilson	RC-2006A	brad.wilson@lakeheadu.ca
Dr. Will Wilson	RC-2006C	wrwilson@aspencroft.ca
Dr. Kamil Zaniewski	RC-2006F	kamil.zaniewski@lakeheadu.ca

**Chair and Lead Coordinator
Office Hours: as posted on each Instructor's door.

Grading:

Laboratory Assignments:		15%
ArcGIS Modules:		15%
Group Project:		50%
Participation/Progress reporting	5%	
Initial planning report	10%	
Proposal presentation	5%	
Report and Database/map deliverables	20%	
Final presentation	10%	
Final Exam:		<u>20%</u>
TOTAL:		**100%**

Meeting Times:

Lectures: Wednesday and Friday   Laboratory: Wednesday
       11:30am – 12:30p.m.   2:30 – 4:30p.m.
       RC-2003   ATAC-3009

Required Materials:

Text: Chang, K., 2016. *Introduction to Geographic Information Systems*, 8th Edition (New York, NY: McGraw-Hill), 448 pages [ISBN 978-0-07-809513-9]
> ***Note:*** *An earlier version of this text is fine for the course. In some cases (for example, the Modules) there may be reference to specific questions or content from the text which happens to fall on a different page in previous versions. Where known, these differences will be made clear.*

Storage Device/Drive: Each student will be required to have a secure method for long-term storage of spatial (and other) files. The laboratory computers in ATAC-3009 (as with all university laboratory hardware), do not allow for storage on the hard drive. It is therefore recommended that you use a drive share (for example, Google Drive can be accessed through your Lakehead Gmail account), your personal drive on the Active Directory, and/or portable USB memory device for digital storage.

Group Projects:

Working in small groups, students will plan and execute a complex project, expected to integrate a suite of spatial data through a series of spatial analyses to solve a current-day problem. A specific outline of expectations for the projects will be discussed the first week of classes, along with the formation of groups and a brief review of example projects completed in Winter 2016. Based on the problem of interest and the expected analyses, groups will work with assigned instructors to develop an appropriate database, analysis workflow and final products. Project topics and a 'rough plan' must be finalized prior to the Project Progress Reports the week of January 30th. A report and presentation on the result of data scoping, database development, and the planned analysis workflow will be provided at the end of February (the week after Reading Week). A final report and 2nd presentation of final results will be provided the final two weeks of the term (refer to the attached schedule).

Course Schedule: (subject to changes)

Week of:	Wednesday Lecture 11:30-12:30, RC-2003	Wednesday Lab 2:30 - 4:30, ATAC-3009	Friday Lecture 11:30-12:30, RC-2003	Reading Requirements[1] / Due Dates
Jan. 9	Intro. - Course Syllabus, Term Projects	Module #1[2] - Data Management & Display	Spatial Project Mgmt *(W. Wilson)*	
Jan. 16	Terrain Analysis *(K. Zaniewski)*	Module #2 - Terrain Mapping & Watershed Analysis	Watershed Analysis *(R. Stewart)*	Chang: Ch. 13, Ch. 14; ***Module #1 due Jan. 18***
Jan. 23	Site Selection & Index Models *(K. Zaniewski)*	Lab#1 - Raster Process Models	Database Development, Data Quality & Error Mgmt (*B. Wilson*)	Chang: Ch. 18; ***Module #2 due Jan. 25***
Jan. 30	Term Project Progress Reports[3]	Lab#1 - Raster Process Models (cont'd)	Raster Local & Neighbourhood Operations *(J. Freeburn)*	Chang: Ch. 11
Feb. 6	Spatial Interpolation Techniques *(J. Freeburn)*	Module #3 - Spatial Interpolation	Network Analysis *(R. Nelson)*	Chang: Ch. 15, Ch. 17; ***Lab #1 due Feb. 8***
Feb. 13	Network Applications *(R. Nelson)*	Module #4 - Network Applications	Spatial Statistics *(W. Wilson)* - *tentative*	***Module #3 due Feb. 15***
Feb. 27	Presentations - Group Project Plan[3]	Module #5 – Spatial Statistics	Presentations - Group Project Plan	***Initial (Group) Planning Report due Feb. 27; Module #4 due Mar. 1***
Mar. 6	GIS Applications in Climatology *(A. Cornwell)*	Lab #2 - Modelling Spatial Relationships	Group Project Work Period	***Module #5 due Mar. 8***
Mar. 13	Group Project Work Period	Group Project Work Period	Group Project Work Period	***Lab #2 due Mar. 15***
Mar. 20	Group Project Seminar - Updates & Questions[4]	Group Project Work Period	Group Project Work Period	
Mar. 27	Group Project Seminar - Updates & Questions	Group Project Work Period	Final Project Presentations[3]	***Final Project Report and Deliverables due Mar. 31***
Apr. 3	Final Project Presentations		Final Project Presentations	

Notes: [1]Readings should be completed PRIOR to the week listed. [2]Module work and lab work will be coordinated by J. Freeburn. Once completed, modules should be sent via email to jason.freeburn@lakeheadu.ca. Deliverables for lab exercises will be outlined for each lab respectively. [3]Group presentations will be jointly evaluated by (available) course instructors. Group project reports will be evaluated by J. Freeburn and can be submitted digitally via email. [4](Available) course instructors will be on-hand to answer questions and facilitate group discussion. The Final Examination period is scheduled for April 10-23; there is no flexibility in the scheduling of final exams.