University of Lethbridge – Department of Geography

Advanced Geographical Information Systems – GEOG 4740

Course Information – Fall 2017

When: Tuesdays/Thursdays: 09:25 - 10:40

Room: Computer Lab E-640

Instructor: Dr. Stefan Kienzle
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Office Hours: Any time (please make an appointment)

Class Notes: https://moodle.uleth.ca/
Test Center: http://www.uleth.ca/teachingcentre/testing-centre
Moodle: https://moodle.uleth.ca/

Labs

Instructor: Marcus Dostie, MSc
When: Lab 1: Mondays 06:00pm – 08.50pm (first Lab Sep. 11)
Lab 2: Wednesdays 06:00pm - 08:50pm (first Lab Sep. 13)
Room: C-757 (Geography Lab)
Office Hours: Wednesdays 4:00pm – 6:00pm, C-460

Recommended Textbook

Kang-tsung Chang: Geographic Information Systems, McGraw Hill (8th edition, earlier editions are also OK)

Other relevant books:

- Burrough PA, McDonnell RA and Lloyd CD 2014: *Principles of Geographical Information Systems*, Oxford University Press
- DeMers MN 2002: *GIS modelling in raster*, John Wiley & Sons
- Longley PA, Goodchild MF, Maguire DJ and Rhind DW (2015): *Geographic information systems and science*, John Wiley & Sons
- Shellito BA 2015: Discovering GIS and ArcGIS
- Zandbergen PA 2013: Python Scripting for ArcGIS
- Many, many others

Course Description

Success in this course requires commitment and self-motivation. GEOG3740 is a prerequisite for the course and it is expected that, as a minimum, you know and remember most that was covered in that course. As such, some of you will have to do more 'refreshing' than others.

At the end of this course you will understand advanced functions and uses of Geographical Information Systems using the ArcGIS software. You will learn how to apply ArcGIS, the leading desktop GIS, and plan a GIS project. You will gain valuable insights and concrete hands-on experience in the processes and pitfalls of advanced spatial analysis and GIS programming. As you will develop real-life applications, you will move through the various phases of project development. Hands-on tutorials and exercises in the GIS laboratory complement the lectures, which are filled with live ArcGIS demonstrations of GIS procedures. Regular problem solving exercises will be used to enhance the skills in translating geographical problems into a GIS framework. A key goal is to teach proper practices and methodologies, while gaining insight in the techniques of spatial analysis and the use of the software. At the end of this course students are expected to plan and carry out a relatively complex GIS projects independently.

The order of topics and their associated labs may change.

Weekly Topics		
Weekly Lecture Dates	**Lecture**	**Lab**
Sep 07	Introduction to course, Review of key GIS functions	No Lab
Sep 12, 14	GeoProcessing	Lab 1: GIS Refresher
Sep 19, 21	Network Analyst, GeoCoding	Lab 2: GeoProcessing
Sep 26, 28	Project Management, Finding Help, GeoDataBases	Lab 3: Network Analysis
Oct 03, 05	ModelBuilder, Python	Project Organization (Thanksgiving)
Oct 10, 12	Python	Lab 4: Model Builder
Oct 17, 19	CostPath, Poster creation,	**Lab Exam 1**
Oct 24, 26	How to Present, TINs, 3D Analyst analyses	Lab 5: Cost Path Analysis
Oct 31, Nov 02	Animations, Terrain analysis in Hydrology	Lab 6: Python
Nov 07, 09	**READING WEEK**	**No Lab**
Nov 14, 16	Uncertainty, GeoStatistics	**Project Time**
Nov 21, 23	Topology, Poster Presentations	Lab 7: Spatial Statistics, Annotation
Nov 28, 30	Poster Presentations	Lab 8: Topology
Dec 05	Poster Presentations, Wrap-up	**Lab Exam 2**

GIS Project & Presentation

Each student has to team up with another student to build a group of two. All groups have to carry out a pre-determined GIS Project. Some key data will be provided. It is up to the student groups to decide how much additional information will be needed to provide a better answer. Project results, together with an explanation of methodology and interpretation, will be displayed in form of a Poster and a class presentation.

Details about the projects and the poster will be given in class.

Plagiarism

Plagiarism is an extremely serious academic offence and carries penalties varying from a written reprimand and failure in an assignment, to debarment from the University. Any student found to have plagiarized or cheated in this course would receive a mark of zero on the work in question, in addition to a written reprimand copied to the Registrar's Office. Definitions and policies regarding plagiarism can be found in the University of Lethbridge Calendar.

Grading

The final grade will be composed according to the Table below.
Marks will be posted on Moodle. A cumulative percentage mark will be determined using the weighting scheme below and converted to a final letter grade as follows:

Grading Proportions	
Item	**Percent of overall grade**
Lab Exam 1	16%
Lab Exam 2	24%
Group Project	12%
Group Poster	8%
Midterm Exam	20%
Final Exam	20%
Total	**100%**

Grading Scheme	
Percentage	**Grade**
90.0 - 100.0	A+
85.0 - 89.9	A
80.0 - 84.9	A-
76.7 - 79.9	B+
73.4 - 76.6	B
70.0 - 73.3	B-
66.7 - 69.9	C+
63.4 - 66.6	C
60.0 - 63.3	C-
56.7 - 59.9	D+
50.0 - 56.6	D
0.0 - 49.9	F

Other Requirements

- You are reminded to ensure that your e-mail account is never full, otherwise you will not be able to receive e-mail.
- In order to back up your lab assignments and GIS data, it is recommended that you have a USB Flash Drive.