GEOG 3222A – Geographic Information Science II
Course Outline: Section 001 Fall 2018

1. Course Information

1.1. Classroom Location:

Class Location and Time:

Lecture:	Thursday	2:30-4:30	UC 65
Lab:	Monday	12:30-2:30	SSC 1059

1.2. Contact Information:

Instructor: Jinfei Wang
Office: SSC 2402
Office Hours: Tuesday 2:30 – 3:30pm; Thursday 4:30-5:30pm
Phone: (519)661-2111 x85017
Email: jfwang@uwo.ca

TA: Nolan Pearce
Office: SSC 2404
Office hours: Monday 11:30 am -12:30 pm; 2:30-3:30 pm
Email: npearce7@uwo.ca

2. Calendar Description

2.1. Course Description

Methods and techniques in Geographic Information Science. Spatial data encoding from maps and geographic database implementation. Spatial interpolation and other modeling techniques. Integration of remote sensing, GIS, and Visualization. Hands-on experience using ESRI ArcGIS software.

2 lecture hours, 2 laboratory hours, 0.5 course
Antirequisite(s): N/A
Prerequisite(s): Geography 2210A/B or Biology 2244A/B or Statistical Sciences 2244A/B; and Geography 2220A/B
Adequate mathematical background is needed to be successful
Prerequisite checking is the student's responsibility

2.2. Senate Regulations

Senate Regulations state, "unless you have either the requisites for this course or written special permission from your Dean to enroll in it, you will be removed from this course and it will be deleted from your record. This decision may not be appealed. You will receive no adjustment to

your fees in the event that you are dropped from a course for failing to have the necessary prerequisites."

3. Textbook

Required Textbook (available in the bookstore):

Peter A. Burrough, Rachael A. McDonnell, and Christopher D. Lloyd, 2015, Principles of Geographical Information Systems (3rd Ed.). Oxford University Press. (ISBN: 9780198742845)

Recommended Readings

Longley, P.A., M.F.Goodchild, D.J.Maguire, and D.W.Rhind, 2016. Geographic Information Systems and Science (4th Ed.). John Wiley & Sons, Inc., 469 p. (978-1-119-03130-7 or ISBN : 978-1-118-67695-0).

Bolstad, Paul, 2016. GIS Fundamentals: A First Text on Geographic Information Systems (5th Ed.). XanEdu Publishing Inc., 770 p. (ISBN 1506695876 or 978-1506695877).

Chang, K.T., 2016. Introduction to Geographic Information Systems (8th Ed.). McGraw Hill, 448 p. (ISBN10: 0078095131 | ISBN13: 9780078095139; eText ISBN: 9781259613449, 1259613445)

4. Evaluation

Evaluation Components	Percentage of Course Grade	Assignment Schedule
Lab Assignments (5 labs)	40%	See "Lab assignments" below
Midterm Test	30%	Thur., Nov. 8, 2:30pm-4:20pm, UCC 65
Project title/topic/data due	2%	Oct. 25
Project Presentations	8%	Nov. 29 & Dec. 6
Term Paper	20%	Dec. 10, 2018

Lab assignments

Lab #	Topic	Weight
Lab 1	Download Geospatial Data from the Internet	5%
Lab 2	Mini GIS Project	10%
Lab 3	ArcGIS Model Builder and Finding the Least-cost Path	10%
Lab 4	3D Building Model Generation from LiDAR data	10%
Lab 5	Network Analysis	5%

1. Attendance and participation: Each student is required to attend all the lectures and labs. Additional material will be provided during classes, including in class exercises that will be important for the midterm test and for understanding GISci.

2. Midterm test: All students are required to take the midterm test. Non-programmable scientific calculators are permitted. No other electronic devices are permitted. No other written aids are allowed. No make-up test will be given unless under extreme circumstances. If you consider that you have grounds to write the midterm test on an alternate date, you must obtain permission from the Dean's office and provide sufficient documentation. In addition, you must inform the instructor at least 2 days in advance before the test.

   Students with special accommodation will write make-up tests administered by the department on Fridays during respective periods of fall term. To prevent prior disclosure, the format and contents of make-ups may differ substantially from the scheduled test or examination. Please see Additional Statements below.

3. Lab assignments and the GIS project:
   You must attend all labs. You should observe all the due dates for the lab assignments and the GIS project. Assignments are due at the beginning of the lab hours of the assignment due dates. Plagiarism or copying is unacceptable. If there are two identical answers to the lab. or parts of the lab., both students will be given a mark of 0 for that lab. Please follow the instructions for the GIS project. The penalty of a late assignment and late project paper is 2^n percent of the maximum mark for the assignment, where n = number of days late. (i.e., If you are late one day, 2% off; two days, 4% off; three days, 8% off; four days, 16% off; five days, 32% off; six days, 64% off; seven days, 100% off). Note: Late assignments can be submitted to the drop off box located under the TV screen in front of the main office before 4 pm. Please write the course number, the instructor and TA name on your assignment. Otherwise, it will not be delivered to your TA.

4. Required computer storage devices: One or two USB memory key, or a portable hard drive for storing data and results. I suggest that you double backup your work on two USBs, in case one USB has problems. Please note: do not insert your USB with the data from the Windows system to a Mac computer, since this may cause errors on your data.

The following is a suggestion as to what could be used to refer students to the policy on Accommodation for Medical Illness:

For Western's Policy on Accommodation for Medical Illness and a downloadable SMC please refer to the Academic Handbook.

Students seeking academic accommodation on medical grounds for any missed tests, exams, participation components and/or assignments worth 10% or more of their final grade must apply to the Academic Counselling office of their home Faculty and provide documentation. Academic accommodation cannot be granted by the instructor or department.

Grades will not be adjusted on the basis of need. It is important to monitor your performance in the course. Remember: *You* are responsible for your grades in this course.

5. Make-up Examinations

Makeups will be granted with approved documentation only. All documentation for missed exams must be provided the Academic Counselling Office and Instructor within 48 hours of the scheduled exam. For missed exams, you must take your documentation to Academic Counselling within 48 hours of the exam. Otherwise, the instructor will assign a grade of zero. The format and content of make-ups may differ substantially from the scheduled test or examination.

6. Use of Electronic Devices

Scientific calculators are permitted during the midterm test. No other aids are permitted.

7. Academic Offences

Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence.

All required papers may be subject to submission for textual similarity review to the commercial plagiarism detection software under license to the University for the detection of plagiarism. All papers submitted for such checking will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the service is subject to the licensing agreement, currently between The University of Western Ontario and Turnitin.com (http://www.turnitin.com).

Computer-marked multiple-choice tests and/or exams may be subject to submission for similarity review by software that will check for unusual coincidences in answer patterns that may indicate cheating.

8. Western's Commitment to Accessibility

The Department of Geography strives at all times to provide accessibility to all faculty, staff, students and visitors in a way that respects the dignity and independence of people with disabilities.

Please contact the course instructor if you require material in an alternate format or if you require any other arrangements to make this course more accessible to you. You may also wish to contact Services for Students with Disabilities (SSD) at 519-661-2147 for any specific question regarding an accommodation. Information regarding accommodation of exams is available on the Registrar's website.

More information about "Accessibility at Western" is available.

9. Medical Issues

The University recognizes that a student's ability to meet his/her academic responsibilities may, on occasion, be impaired by medical illness. The Student Services website provides greater detail about the University's policy on medical accommodation. This site provides links the necessary forms. In the event of illness, you should contact Academic Counselling as soon as possible. The Academic Counsellors will determine, in consultation with the student, whether or not accommodation should be requested. They will subsequently contact the instructors in the relevant courses about the accommodation. Once the instructor has made a decision about

whether to grant an accommodation, the student should contact his/her instructors to determine a new due date for tests, assignments, and exams.

Students must see the Academic Counsellor and submit all required documentation in order to be approved for certain accommodation.

10. Mental Health

If you or someone you know is experiencing distress, there are several resources here at Western to assist you. Please visit Western's Health and Wellness website for more information on mental health resources.

11. Support Services

Student Support Services
Student Development Services

12.Important Dates

September 6: Classes resume
September 14: Last day to add a full course or a second term half course
October 8: Thanksgiving Holiday – Department Office Closed
October 9-13: Fall Reading Week (No classes; Department Office open
November 12: Last day to drop a first term half course without penalty
November 30: Last day to drop a full course without academic penalty
December 7: Classes end
December 8 and 9: Study days
December 10-21: Examination Period
December 21: Fall term ends.

Topics and Recommended Readings

Part 1. Introduction - GIS Overview

Readings: Burrough, *Principles of Geographical Information Systems* (3rd Ed.) Chapter 1

Part 2. Datum, Coordinate Systems and Map Projection

Readings: Bolstad, 4th Ed.: Chapter 3

Part 3. Geospatial Data

Readings: Burrough, *Principles of Geographical Information Systems* (3rd Ed.) Chapter 2; Chapter 3.

Part 4. Digital Elevation Models

Readings: Burrough, *Principles of Geographical Information Systems* (3rd Ed.) Chapter 11

Part 5. Cost Distance and Least Cost Path

Readings: ArcGIS online help.

Part 6. Spatial Interpolation

Readings: Burrough, *Principles of Geographical Information Systems* (3rd Ed.) Chapter 8; Chapter 9.

Part 7. Network Analysis

Readings: Chang, K.T., 2016. Introduction to Geographic Information Systems (8th Ed.) Chapter 17.

Part 8. Spatial Analysis – Raster and Vector Geoprocessing

Readings: Burrough, *Principles of Geographical Information Systems* (3rd Ed.) Chapter 7; Bolstad, 4th Ed.: Chapters 8, 9, 10 and 11.

Part 9. Remote Sensing and GIS Integration

Reference: Bolstad, 4th Ed.: Chapter 6.

Part 10. GIS Case Studies – Guest lectures

Tentative Lecture/lab Schedule

Week #	Date of Monday.	Lecture topics	Labs assigned	Labs due
Week 1	Sept.3	Introduction to the course; 1. GIS Overview		
Week 2	Sept.10	1.GIS Overview 2. Datum, coordinate systems and map projection	No lab	
Week 3	Sept.17	2. Datum, coordinate systems and map projection	Lab #1	
Week 4	Sept.24	3. Geospatial data collection 4. Digital Terrain Modeling	Lab #2	
Week 5	Oct.1	4.Digital Terrain Modeling. Cost distance and least cost path	Lab #2	Lab#1 due
Week 6	Oct.8	Thanksgiving, Fall reading week, no class,	No lab	
Week 7	Oct.15	5. 4. Cost distance and least cost path 6. Spatial interpolation Discussion of project	Lab #3	Lab #2 due
Week 8	Oct.22	7. Spatial interpolation Discussion of project titles/topics/data collection	Lab #3	
Week 9	Oct. 29	7. Network analysis 8. Spatial analysis – Raster and vector geoprocessing	Lab #4	Lab #3 due
Week 10	Nov. 5	Midterm test, Nov. 8, 2018 (2:30 pm - 4:20 pm)	Lab #4	
Week 11	Nov. 12	9. Remote sensing and GIS integration GIS project discussion	Lab #5	Lab #4 due
Week 12	Nov. 19	10. GIS/RS case studies GIS project discussion	Lab #5	Lab #5 due
Week 13	Nov.26	GIS project presentations		
Week 14	Dec. 3	GIS project presentations	Presentations if needed	Term paper due Dec. 10, 2018

Last day of classes: Dec. 7, 2018.