

GEOG 9110B: Introduction to Geographic Information Systems

Course Outline: Section 001 Winter 2019

1. Course Information

1.1. Contact Information:

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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.

More information about "Accessibility at Western" is available at: <http://accessibility.uwo.ca>

2. Calendar Objective

This course is designed to introduce graduate students to fundamental concepts and techniques of Geographic Information Systems (GIS). There are three major objectives of this course: (1) to understand the concepts and theory of commonly used in GIS; (2) to gain hands-on experience using GIS software and other spatial techniques, and to develop problem solving skills; and (3) to complete a GIS project, including data collection, georeferencing, data analysis and output, and report writing.

3. Calendar Description

Geographic Information Systems play important roles for many academic disciplines, government organizations and commercial enterprises. GIS applications cover a very wide variety of subject matter ranging from social sciences to environmental sciences, including urban and regional planning, civil engineering, resource management, agriculture, forestry, geology, environmental monitoring, waste management and business.

GIS is a combination of the computer hardware, software, data, methods and people, which provides input, management, retrieval, analysis, and presentation of spatially referenced information. By linking

attribute data with maps, GIS can reveal relationships not apparent using traditional paper maps and item-reference information systems. GIS provides a set of powerful tools for spatial analysis, mapping, visualization and communication of information.

Practical skills will be developed through the use of ArcGIS and extensions. Students may choose to use other GIS software for the project if they wish. By the end of the course, the students should be able to apply what they have learned to their own GIS related research, to solve problems on their own, to learn new functions and to be prepared to continue with more advanced GIS courses.

4. Course Prerequisites

There are no formal prerequisites. Familiarity with Windows environment is required. A general understanding of geography is helpful, but no geography courses are required.

5. Textbook

Chang K., 2015, *Introduction to Geographic Information Systems (8th Ed.)* McGraw Hill. (ISBN: 0077465431)

Recommended textbooks:

Bolstad, P., 2012. GIS Fundamentals. Eider Press. (ISBN 0-9717647-1-9)

Burrough, P.A., R.A. McDonnell, and C.D. Lloyd, 2015, Principles of Geographical Information Systems. Oxford University Press. (ISBN 0-19-823365-5)

Lo, C.P., A.K.W.Yeung, 2017. Concepts and Techniques of Geographic Information Systems. Prentice Hall. (ISBN 0-13-149502-X)

Longley, P.A., M.F.Goodchild, D.J.Maguire, and D.W.Rhind, 2015. Geographic Information Systems and Science. John Wiley & Sons. (ISBN 0-470-87001-X)

ESRI, 2013. Getting to know ArcGIS desktop. ESRI Press. (ISBN 1-58948-083-X)

6. Other Requirements

Computer accounts:

You need a computer account to log on the computers in the two computer labs (Big Data Lab – SSC 1059 and GISci Lab – SSC 1316A). You have 24-hour access to both labs.

Computer storage devices:

One USB memory key or other portable storage device for storing your data and results.

Late penalty:

Late labs and projects have a penalty of 2% per day. Labs/projects submitted more than 1 week late will not be accepted.

7. Evaluation

Your final grades will be based on composite performances for the following:

Lab assignments	40%
Project proposal	10%
Project report	50%

Date	Lectures	Date	Labs	Projects
Jan 9	Introduction: Course outline			
	Lecture 1 GIS Overview Geographically referenced data			
	Lecture 2 Geographic data presentation Coordinate systems			
	Lecture 3 Spatial data input Attribute data input			
	Lecture 4 Vector data analysis Raster data analysis	Feb 5	Acquiring GIS data	
	Lecture 5 Spatial interpolation Network analysis	Feb 12	Lab #1 Tutorial	Select a topic
Feb 20	Reading Week	Feb 19	Reading Week	
Feb 27	Lecture 6 GIS models and modelling	Feb 26	Lab #2 Tutorial Lab #1 due	
		Mar 5	Lab #3 Tutorial <i>Lab #2 due</i>	Developing project proposal
		Mar 12	Lab #4 Tutorial <i>Lab #3 due</i>	Developing project proposal
		Mar 19	Lab #4 due	Project proposal due Supervised lab work
		Mar 26		Supervised Lab Work
		Apr 2		Supervised Lab Work
		Apr 9		Project Report Due

GIS Project

Step 1: Selection of a topic (Feb. 12, 2019)

Step 2: Preparation of the data base

If data are already in digital format, you need to import data, do proper format conversion and georeference your data. In other cases, you will have to digitize your maps, or collect field data.

Step 3: Project proposal (Due March 19, 2019)

The proposal should include: (1) the title; (2) introduction; (3) data sources; (4) what methods do you plan to use; (5) what are the expected results; and (6) references

Step 4: Project report (Due Apr. 9, 2019)

Submit a written report of your project along with the results you have produced. The written report must be typed, double space, around 10 pages plus figures and tables. It should include the following:

- A title (followed by your name and affiliation)
- Introduction (including statement of project objectives and a brief literature review)
- Data description (including discussion of the data used, rationale for selecting the variables for input to GIS, sources of data, and any problems /limitations of the data/data sources used, description of data format, any conversion between data format involved and why this is necessary)
- Methods (including the procedures of the project, description of GIS functions used in the project and the principles behind them)
- Data analysis and interpretation of the results
- Conclusions
- Acknowledgement if applicable
- References

Students are responsible for material covered in the lectures as well as the assigned chapters/sections in the text. Students are **REQUIRED TO COMPLETE ALL COMPONENTS** of this course. There are no exceptions to this. Extra assignments to improve grades **will NOT** be accepted.

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.

8. University Policy Regarding Illness

8.1. Illness

Please visit the link to the university policy for more information.

<http://www.westerncalendar.uwo.ca/PolicyPages.cfm?Command=showCategory&PolicyCategoryID=1&SelectedCalendar=Live&ArchiveID=- Page 12>

If you feel that you have a medical or personal concern that is interfering with your work, you should contact your Instructor, Graduate Program Administrator, Supervisor, or SGPS.

8.2. Attendance

It is expected that students will attend all classes. The professor does not provide access to lecture notes. Students are encouraged to obtain missed lecture notes from a fellow student.

9. Scholastic Discipline for Graduate Students

For the complete policy and regulations see: http://grad.uwo.ca/current_students/regulations/13.html

10. Procedures for Appealing Academic Evaluations

Students may appeal an academic decision or ruling in accordance with the appeal procedures set out below. Students have a right to appeal to their graduate programs and, if unsuccessful, to the Vice-Provost (Graduate and Postdoctoral Studies). Some decisions may be appealed further to the Senate Review Board Academic. The Vice-Provost's rulings in academic matters are final unless overturned or modified on appeal to the Senate Review Board Academic (SRBA).

For the complete policy and regulations see: http://grad.uwo.ca/current_students/regulations/13.html

11. Support Services

11.1. Support Services

Student Support Services can be reached at: <http://westernusc.ca/services/>

Student Development Services can be reached at: <http://www.sdc.uwo.ca/>

11.2. Short Absences

If you miss a class due to minor illness or other problems, check your course outline for information regarding attendance requirements and make sure you are not missing a test or exam. Cover any readings and arrange to borrow the missed lecture notes from a classmate.

11.3. Extended Absences

If you expect to be away from campus for an extended amount of time, please make prior arrangements with your course instructors and/or supervisor.

For the complete policy on registration, see:
http://grad.uwo.ca/current_students/regulations/4.html

11.4. Academic Concerns

If you are in academic difficulty, it is strongly recommended that you see your Graduate Program Administrator, Supervisor, or SGPS.

12. Health and Wellness

As part of a successful graduate student experience at Western, we encourage students to make their health and wellness a priority. Western provides several on campus health-related services to help you achieve optimum health and engage in healthy living while pursuing your graduate degree. For example, to support physical activity, all students, as part of their registration, receive membership in Western's Campus Recreation Centre. Numerous cultural events are offered throughout the year.

Please check out the Faculty of Music web page <http://www.music.uwo.ca>, and our own McIntosh Gallery <http://www.mcintoshgallery.ca/>. Information regarding health- and wellness-related services available to students may be found at <http://www.health.uwo.ca/>

Students seeking help regarding mental health concerns are advised to speak to someone they feel comfortable confiding in, such as their faculty supervisor, their program director (graduate chair), or

other relevant administrators in their unit. Campus mental health resources may be found at http://www.health.uwo.ca/mental_health/resources.html

To help you learn more about mental health, Western has developed an interactive mental health learning module, found here: http://www.health.uwo.ca/mental_health/module.html. This module is 30 minutes in length and provides participants with a basic understanding of mental health issues and of available campus and community resources. Topics include stress, anxiety, depression, suicide and eating disorders. After successful completion of the module, participants receive a certificate confirming their participation.

13. 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. More information about “Accessibility at Western” is available at: <http://accessibility.uwo.ca>

14. Other Information

For a list of Graduate Regulations, please visit:

http://www.grad.uwo.ca/current_students/regulations/index.html

For The University of Western Ontario Senate Regulations, please see the Handbook of Academic and Scholarship Policies at: http://www.uwo.ca/univsec/academic_policies/index.html

Please respect the fact that Professors receive multiple emails from students and will deal with those emails in a fair, organized and timely manner. Please ensure the subject line contains the name, number and section of the course in question.