

Geography 381/Planning 381
Spatial Analysis Using Geographic Information Systems (Spring 2019)

Instructor: Nastaran Saberi

Class Time: 8:30 am - 11:20 am Friday EV3 1408

Office Hours: Friday 1 pm to 3pm, or by appointment (EV1-235)

If you need to schedule an appointment outside of these hours, please contact me.

E-mail: nsaberi@uwaterloo.ca

From Monday to Friday, I make every effort to answer emails within 24hrs. Email sent on the weekend will normally be answered on the following Monday.

Labs:

Lab 101: 8:30 am-10:20 am Monday EV2 1002A

Lab 102: 4:30 pm-6:20 pm Tuesday EV2-1002A

Lab 103: 10:30 pm-12:20 pm Wednesday-EV2-1002A

Lab 104: 4:30 pm-6:20 pm Friday-EV2-1002A

TAs:

Q Chen; q.chen@uwaterloo.ca

Justin Murfitt; jmurfitt@uwaterloo.ca

Weikai Tan; weikai.tan@uwaterloo.ca

Khairunnabila Prayitno; khairunnabila.prayitno@uwaterloo.ca

Course Description

This course blends traditional GIS lab assignments with a problem-based approach to learning organized around five assignments. Lab assignments focus on the introduction of students to advanced functions of GIS, including automation through model building and scripting. Each assignment will be focused on solving a real-world problem using GIS. There is no single 'correct' answer, but rather, students will be required to think creatively, build on topics taught in class and data provided, and develop an appropriate solution using GIS. This format is intended to mirror how GIS is often used in the working world - where solutions are not prescribed, but rather, created.

The course builds on the knowledge and skills developed in GEOG/PLAN 281 and focuses on using GIS to perform selected types of spatial analyses. Students will learn how to perform different types of spatial analyses, identify the types of questions different analysis approaches can answer, critically evaluate the advantages and limitations of different approaches, and gain a better understanding of the use of capabilities of spatial analysis.

*****Please note:** In GEOG 381, creative problem solving and experimentation will be rewarded. Data provided for each case study and techniques that are introduced in class should be considered as a starting point only. To achieve an excellent mark, you will need to move beyond these or implement them in some unique way.

Course Objectives

By the end of the course, students should be able to:

1. Choose an *appropriate* analytic approach and methods to study a given geospatial problem
2. Demonstrate awareness and mastery of key techniques of geospatial analysis using desktop GIS software and methods of extending GIS, including model building and scripting
3. Critically evaluate the use of geospatial tools as they are applied to geospatial problems
4. Develop the problem-solving skills required to *independently* extend desktop GIS functionality to address novel situations and challenges in spatial analysis

Evaluation

This course will mix lecture-style delivery of content with laboratory assignments, each designed to support the development of technical skills. Students can team up (with a maximum of four) to have 10-min presentations about case studies where geospatial data analysis is conducted. A presentation is not required for the course; however, it is highly recommended as it adds up bonus marks—up to 10%—to your final grade. You can select your own topic and discuss the resources with me or I can provide topics and resources of your topic.

Assessment

- Assignment #1 – Mapping Crime Occurrence 15%
 - Assignment #2 – Model Builder and Python 15%
 - Assignment #3 – Using Python to Scrape Twitter 20%
 - Assignment #4 – Network Analyst 20%
 - Assignment #5 – Multicriteria Analysis 25%
 - Active Participation in class – Clicker questions 5%
- There is no final exam.

Having handheld clickers are required for this course and the purpose is maximizing students' engagement in the learning process. We will use clickers from the second session on May 17 till July 19, except two help sessions on Jun 21 and July 12. Please read the provided link in order to have more information on where to get a clicker and how to use it.

<https://uwaterloo.ca/centre-for-teaching-excellence/teaching-resources/teaching-tips/educational-technologies/all/clickers-how-students>

Administrative:

Deadlines

Assignments are due on the date specified at the top of the assignment handout.

Unclaimed assignments: Unclaimed assignments will be retained for one term after the course is finished. After that time, they will be destroyed in compliance with UW's confidential shredding procedures.

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Religious Observances: Student needs to inform the instructor at the beginning of term if special accommodation needs to be made for religious observances that are not otherwise accounted for in the scheduling of classes and assignments.

LEARN: Users can login to LEARN via:<http://learn.uwaterloo.ca/> use your WatIAM/Quest username and password. LEARN is an essential component of this course, so please be sure to login for course updates and information. The PowerPoint files are provided to simplify the note taking process and to ensure that diagrams are copied correctly. **I will add many details during class, including explaining diagrams, images, and concepts.** You are responsible for all materials presented in lecture.

Textbook: There is no assigned textbook for this course.

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Date	Lecture Topics	Lab Activity
Week #1 May 10	L01 - Course introduction, expectations, syllabus, and introduction to spatial analysis - Review of 281 concepts	No labs
Week #2 May 17	L02 – Data gathering, management, structuring, geocoding Point analysis + clusters Introduction to Assignment #1	
Week #3 May 24	L03 - Model Builder - What is a model? - Automation benefits incl. working with ArcGIS Model Builder	Assignment #1 due before class
Week #4 May 31	L04 - Python Syntax and structure as applied to ArcGIS Introduction to Assignment #2	
Week #5 June 7	L05 – Introduction to Twitter API, web maps and mapping	Assignment #2 due before class
Week #6 Jun 14	Introduction to Assignment #3 Gathering Twitter data with Tweepy	
Week #7 June 21	L06 - Networks and ArcGIS Network Analyst Tutorial -Weighting methods and ranking options	
Week #8 June 28	Networks and ArcGIS Network Analyst help session Assignment #4 Introduction	Assignment #3 due before class
Week #9 July 5	L07 – Multi-Criteria Evaluation/ Site selection Assignment #5 Introduction	
Week #10 July 12	Course Summary Guest Lecturer	Assignment #4 due
Week #11 July 19	MCE help session	
Week #12 July 26		
Week #13 August 2		Assignment #5 due