



COURSE OUTLINE
ADVANCED SPATIAL ANALYSIS AND GEOSTATISTICS

Instructor: Dr. Chris Bone

Office Hours: Fridays 10:00am – 12:00pm and by appointment, DTB A237

Contact: chrisbone@uvic.ca

Lecture: Thursdays, 2:30pm – 4:20pm, MAC D010

Teaching Assistant: Jason Kelley

Office Hour: Mondays 11:00am – 12:00pm Room DTB B206

Contact: jkkelley@uvic.ca

**** Please note that we only respond to emails during 8:00am to 5:00pm Mondays to Fridays***

COURSE DESCRIPTION

This course introduces students to a variety of spatial analysis techniques that can be used for understanding geographic phenomena. Topics covered in this course include descriptive spatial analysis, spatial sampling, inferential spatial analysis, and spatial interpolation. Lectures focus on the geographic theory and equations behind each method, while labs provide an opportunity for students to implement a variety of techniques to address questions that are geographic in nature. All labs and exercises are completed using the scientific programming language *R*. Students who successfully complete this course will not only have more analytical tools at their disposal, but will also become versed in spatial analysis discourse, which will allow them to interrogate scientific research employing a range of spatial analytical approaches.

KEY THEMES: Spatial analysis, statistics, programming, communicating science

REQUIRED TEXTS

All readings are provided each week on Brightspace

Course requires multiple software: Kritik Peer Assessment Tool (\$24); *R* and R Studio; Brightspace

LEARNING OUTCOMES

- Define appropriate spatial analysis methods needed for specific geographical questions.
- Analyze geographic data to characterize spatial patterns of observations and spatial relationships between variables.
- Analyze and interpolate spatial data in order to create continuous surfaces.
- Demonstrate the ability to implement a suitable spatial analytical workflow for providing answers to geographic questions.
- Demonstrate proficiency in using the scientific programming language *R* to conduct spatial analysis.
- Demonstrate familiarity with spatial analysis language in order to effectively interrogate scientific research employing relevant methods.

EVALUATION

Assignment 1: Designing a Spatial Sampling Design	10%
Assignment 2: Performing Spatial Statistics	15%
Assignment 3: Collecting and Mapping Event-based Observations	10%
Assignment 4: Point Pattern Analysis	15%
Assignment 5: Spatial Interpolation	10%
Assignment 6: Universal Kirging	15%
Final Project: Vulnerability to Natural Disasters	25%

NOTE: Students will not be given an opportunity to submit any additional work for extra grades.

GRADING SYSTEM

As per the Academic Calendar:

Grade	Grade point value	Grade scale	Description
A+ A A-	9 8 7	90-100% 85-89% 80-84%	Exceptional, outstanding and excellent performance. Normally achieved by a minority of students. These grades indicate a student who is self-initiating, exceeds expectation and has an insightful grasp of the subject matter.
B+ B B-	6 5 4	77-79% 73-76% 70-72%	Very good, good and solid performance. Normally achieved by the largest number of students. These grades indicate a good grasp of the subject matter or excellent grasp in one area balanced with satisfactory grasp in the other area.
C+ C	3 2	65-69% 60-64%	Satisfactory, or minimally satisfactory. These grades indicate a satisfactory performance and knowledge of the subject matter.
D	1	50-59%	Marginal Performance. A student receiving this grade demonstrated a superficial grasp of the subject matter.
F	0	0-49%	Unsatisfactory performance. Wrote final examination and completed course requirements; no supplemental.
N	0	0-49%	Did not write examination or complete course requirements by the end of term or session; no supplemental.

GEOGRAPHY DEPARTMENT INFO

- Geography Department website: uvic.ca/socialsciences/geography/
- Geography Department Chair: geogchair@uvic.ca
- Geography Undergraduate Advising: geogadvising@uvic.ca

POLICY ON LATE ASSIGNMENTS

Assignments will be accepted one day (24 hours) past the due date accompanied with a 10% late penalty. Assignments will not be accepted after this time, but students will still be able to obtain a grade if they participate in the peer assessment portion of the assignment.

ACADEMIC INTEGRITY

It is every student's responsibility to be aware of the university's policies on academic integrity, including policies on **cheating, plagiarism, unauthorized use of an editor, multiple submission, and aiding others to cheat.**

Policy on Academic Integrity: web.uvic.ca/calendar2019-09/undergrad/info/regulations/academic-integrity.html

ACCESSIBILITY

Students with diverse learning styles and needs are welcome in this course. In particular, if you have a documented disability or health consideration that may require accommodations, please feel free to approach me and/or the Centre for Accessible Learning (CAL as soon as possible <https://www.uvic.ca/services/cal/>). The RCSD staff is available by appointment to assess specific needs, provide referrals, and arrange appropriate accommodations. The sooner you let us know your needs, the quicker we can assist you in achieving your learning goals in this course.

POSITIVITY AND SAFETY

The University of Victoria is committed to promoting, providing and protecting a positive and safe learning and working environment for all its members.

SEXUALIZED VIOLENCE PREVENTION AND RESPONSE AT UVIC

UVic takes sexualized violence seriously, and has raised the bar for what is considered acceptable behaviour. We encourage students to learn more about how the university defines sexualized violence and its overall approach by visiting uvic.ca/svp. If you or someone you know has been impacted by sexualized violence and needs information, advice, and/or support please contact the sexualized violence resource office in Equity and Human Rights (EQHR). Whether or not you have been directly impacted, if you want to take part in the important prevention work taking place on campus, you can also reach out:

Where: Sexualized violence resource office in EQHR; Sedgewick C119

Phone: 250.721.8021

Email: svpcoordinator@uvic.ca

Web: uvic.ca/svp

COURSE EXPERIENCE SURVEY (CES)

I value your feedback on this course. Towards the end of term, as in all other courses at UVic, you will have the opportunity to complete an anonymous survey regarding your learning experience (CES). The survey is vital to providing feedback to me regarding the course and my teaching, as well as to help the department improve the overall program for students in the future. The survey is accessed via MyPage and can be done on your laptop, tablet, or mobile device. I will remind you and provide you with more detailed information nearer the time but please be thinking about this important activity during the course.

WEEKLY CALENDAR

WEEK	DATE	
1	September 8	Spatial Sampling
2	September 15	Fieldwork in Mystic Vale
3	September 22	Spatial Descriptive Statistics
4	September 29	Point Pattern Analysis I
5	October 6	Point Pattern Analysis II
6	October 13	Spatial Interpolation I
7	October 20	Spatial Interpolation II
8	October 27	Scientific Writing for Spatial Analysts
9	November 3	Final Project Scoping
10	November 10	Reading Break: No Lecture
11	November 17	Spatial Autocorrelation
12	November 24	Conference Poster Preparation
13	December 1	Poster Conference

September 23rd

Last day for adding course that begin in the first term

October 31st

Last day for withdrawing from course without penalty of failure

ASSIGNMENT DEADLINES

Assignment 1 (10%)	Part A: Monday, September 19 @ 11:59pm	Part B: During Week 3 Lab
Assignment 2 (15%)	Monday, October 3 @ 11:59pm	
Assignment 3 (10%)	Part A: Monday, September 19 @ 11:59pm	Part B: During Week 6 Lab
Assignment 4 (15%)	Monday, October 10 @ 11:59pm	
Assignment 5 (10%)	Part A: Monday, September 19 @ 11:59pm	Part B: During Week 8 Lab
Assignment 6 (15%)	Monday, October 17 @ 11:59pm	
Final Project (25%)	Part A: Wednesday, November 30 th at 11:59pm	Part B: During Week 13 Lecture

DISCLAIMER

The above schedule, policies, procedures, and assignments in this course are subject to change in the event of extenuating circumstances.

NOTE:

A note to remind you to take care of yourself. Do your best to maintain a healthy lifestyle this semester by eating well, exercising, getting enough sleep and taking some time to relax. This will help you achieve your goals and cope with stress. All of us benefit from support during times of struggle. You are not alone.

Counselling Services - *Counselling Services can help you make the most of your university experience. They offer free professional, confidential, inclusive support to currently registered UVic students. uvic.ca/services/counselling/*

Health Services - *University Health Services (UHS) provides a full service primary health clinic for students, and coordinates healthy student and campus initiatives. uvic.ca/services/health/*

Centre for Accessible Learning - *The CAL staff are available by appointment to assess specific needs, provide referrals and arrange appropriate accommodations uvic.ca/services/cal/. The sooner you let us know your needs the quicker we can assist you in achieving your learning goals in this course.*

Elders' Voices - *The Office of Indigenous Academic and Community Engagement (IACE) has the privilege of assembling a group of Elders from local communities to guide students, staff, faculty and administration in Indigenous ways of knowing and being. uvic.ca/services/indigenous/students/programming/elders/index.php*

We acknowledge and respect the lək'wəŋən peoples on whose traditional territory the university stands and the Songhees, Esquimalt, and W̱SÁNEĆ peoples whose historical relationships with the land continue to this day.