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**COURSE OUTLINE**  
**ADVANCED SPATIAL ANALYSIS**

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**Office Hours: Mondays 1:00pm – 2:00pm and by appointment**

**Office Location: DTB A237**

**Contact: [chrisbone@uvic.ca](mailto:chrisbone@uvic.ca)**

**Teaching Assistant: Jason Kelley**

**Office Hour: Thursdays 12:30pm – 1:30pm in room A250a**

**Contact: [jkelly@uvic.ca](mailto:jkelly@uvic.ca)**

**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, spatial interpolation, spatial correlation and geographic regression. 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

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**REQUIRED TEXTS**

All readings are provided each week on CourseSpaces

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**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

Assignments (4)	= 55%
Final Project	= 30%
Weekly Quizzes	= 15%

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
<b>A+</b> <b>A</b> <b>A-</b>	9 8 7	90-100% 85-89% 80-84%	<b>Exceptional, outstanding and excellent</b> 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> <b>B</b> <b>B-</b>	6 5 4	77-79% 73-76% 70-72%	<b>Very good, good and solid</b> 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.
<b>C+</b> <b>C</b>	3 2	65-69% 60-64%	<b>Satisfactory, or minimally satisfactory.</b> These grades indicate a satisfactory performance and knowledge of the subject matter.
<b>D</b>	1	50-59%	<b>Marginal</b> Performance. A student receiving this grade demonstrated a superficial grasp of the subject matter.
<b>F</b>	0	0-49%	<b>Unsatisfactory</b> performance. Wrote final examination and completed course requirements; no supplemental.
<b>N</b>	0	0-49%	Did not write examination or complete course requirements by the end of term or session; no supplemental.

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## GEOGRAPHY DEPARTMENT INFO

- Geography Department website: <http://geog.uvic.ca>
- Undergraduate Advisor: Dr. Shannon Fargey – [geogadvisor@uvic.ca](mailto:geogadvisor@uvic.ca)

## COURSESPACES

Please visit your CourseSpaces site to access the website for Geog 418/518.

## **POLICY ON LATE ASSIGNMENTS**

Late assignments will be penalized 10% per day. Assignments will not be accepted after 5 days past the due date.

## **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](http://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 CAL 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](http://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](mailto:svpcoordinator@uvic.ca)

Web: [uvic.ca/svp](http://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.

## 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/](http://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/](http://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/](http://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](http://uvic.ca/services/indigenous/students/programming/elders/index.php)

## WEEKLY CALENDAR

WEEK	DATE	
1	Sept. 5	Descriptive & Spatial Statistics
2	Sept. 12	Inferential Spatial Statistics
3	Sept. 19	Point Pattern Analysis
4	Sept. 26	The $k$ -function and Kernel Density Estimation
5	Oct. 3	Spatial Autocorrelation & Sampling
6	Oct. 10	Global & Local Moran's $I$
7	Oct. 17	Geostatistics
8	Oct. 24	Spatial Interpolation
9	Oct. 31	Trend Surface Analysis
10	Nov. 7	Regression Analysis
11	Nov. 14	Final Project Scoping
12	Nov. 21	Geographically Weighted Regression
13	Nov. 28	Scientific Writing
14	Dec. 5	Course Wrap-up

### Assignment Schedule

**Assignment 1:** Descriptive Statistics (10%)

Due September 23<sup>rd</sup>/24<sup>th</sup> at 11:55pm

**Assignment 2:** Point Pattern Analysis (15%)

Due September October 7<sup>th</sup>/8<sup>th</sup> at 11:55pm

**Assignment 3:** Spatial Autocorrelation (15%)

Due October 21<sup>st</sup>/22<sup>nd</sup> at 11:55pm

**Assignment 4:** Geostatistics (15%)

Due November 4<sup>th</sup>/5<sup>th</sup> at 11:55pm

**Final Project** (30%)

Due December 6<sup>th</sup> at 11:55pm