



COURSE OUTLINE
ADVANCED SPATIAL ANALYSIS

Office Hours: THURSDAYS 1:00pm – 2:00pm and by appointment

Office Location: DTB A237

Contact: chrisbone@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

REQUIRED TEXTS

Advanced Spatial Analysis. Provided by Top Hat (details will be given in first lecture)

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 | = 25% |
| Readings and In-class Questions | = 10% |
| Quizzes | = 10% |

**Assignments are not equally weighted*

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: <http://geog.uvic.ca>
- Undergraduate Advisor: Dr. Phil Wakefield – 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.

PLAGIARISM

Plagiarism is not permitted. For more information about what constitutes plagiarism, please visit:

<http://www.uvic.ca/learningandteaching/students/resources/expectations/>

Policy on Academic Integrity: <http://web.uvic.ca/calendar2015-01/FACS/UnIn/UARe/PoAcl.html>

ACCESSIBILITY

Students with diverse learning styles and needs are welcome in this course. In particular, if you have a documented disability/health consideration that may require accommodations, please feel free to approach me and/or the Centre for Accessible Learning as soon as possible. The CAL staff are available by appointment to assess specific needs, provide referrals and arrange appropriate accommodations <http://www.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.

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.

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 | Sept. 5 | Welcome |
| 2 | Sept. 11 - 12 | Descriptive & Spatial Statistics |
| 3 | Sept. 18 - 19 | Inferential Spatial Statistics |
| 4 | Sept. 25 - 26 | Nearest Neighbor and Quadrat Analysis |
| 5 | Oct. 2 - 3 | The k -function and Kernel Density Estimation |
| 6 | Oct. 9 - 10 | Spatial Autocorrelation & Sampling |
| 7 | Oct. 16 - 17 | Global & Local Moran's I |
| 8 | Oct. 23 - 24 | Geostatistics and Inverse Distance Weighting |
| 9 | Oct. 30 - 31 | Kriging and Trend Surface Analysis |
| 10 | Nov. 6 - 7 | Scientific Writing |
| 11 | Nov. 13 - 14 | Reading Break |
| 12 | Nov. 20 - 21 | Regression Analysis |
| 13 | Nov. 27 - 28 | Geographically Weighted Regression |
| 14 | Dec. 4 - 5 | Course Review |

Assignment Schedule

Assignment 1: Descriptive Statistics (10%)

Due Monday, September 24th/Tuesday, September 25th at 11:59pm

Assignment 2: Point Pattern Analysis (15%)

Due Monday, October 8th/Tuesday, October 9th at 11:59pm

Assignment 3: Spatial Autocorrelation (15%)

Due Monday, October 22nd/Tuesday, October 23rd at 11:59pm

Assignment 4: Geostatistics (15%)

Due Friday, November 16th at 11:59pm

Final Project (25%)

Sunday, December 9th at 11:59pm

Quiz Schedule (all quizzes are worth 2.5% each)

Quiz 1: Friday, October 5th

Quiz 2: Friday, October 19th

Quiz 3: Friday, November 2nd

Quiz 4: Wednesday, December 5th