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## **Applied Statistics for Geographers**

*In the Information Age, data is no longer scarce – it's overpowering.*

John Dillard

President, Big Sky Consulting

**Lectures** Tuesday 2:30-4:20 CLE D130      **Lab** CLE A105    Friday 9:30-12:20.

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**Office Hours:** Monday 10-11 AM, 1:30-3:30 PM.    Thursday 10-11 AM, 1:30-3:30 PM

**Office Location:** Turpin B352

**Contact:** 250-721-7337    msf@uvic.ca

### **COURSE DESCRIPTION**

From satellites continuously orbiting the globe, sensors placed on the ocean floor, social network sites like Facebook, from teams of students coring trees or conducting interviews in First Nations communities, data are being collected everywhere and all the time. While computers allow us to store massive amounts of data, statistical methods are essential to the process of extracting useful information. If your passion is the environment, statistics help us to understand the impacts of climate change on oceans, plant and animal ranges, and human health. If your passion is in public policy, statistics help to inform governments and non-governmental organizations about the effectiveness of government programmes such as poverty alleviation, community recycling, and opioid addiction reduction. In order to sort through and correctly interpret the wealth of data that are available, however, you need to understand the strengths and weaknesses of different statistical analysis tools.

### **COURSE GOAL**

This course builds on the basic knowledge of descriptive and inferential statistics and probability theory acquired in Geography 226. It aims to make students more knowledgeable practitioners, consumers, and evaluators of physical and social science data and research. This course will cover a breadth of tools that will help you design effective studies, make inferences from raw data, and translate those inferences into meaningful contexts.

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## LEARNING OUTCOMES

By the end of this course students will:

1. Be able to describe the goals of various statistical methodologies conceptually.
  2. Have a greater appreciation of the value of statistical techniques in the context of everyday life and further studies.
  3. Be able to select the appropriate statistical tools to analyze a particular problem
  4. Be able to communicate the results of statistical analyses effectively both orally and in writing.
  5. Be able to apply a healthy scepticism to statistical findings published in the scientific and gray literature based on a critical consideration of the techniques employed.
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## COURSE TOPICS

The primary focus of this course is on parametric statistics. A few non-parametric methods will also be examined to as to illustrate that alternatives may be available if the assumptions of parametric methods cannot be met. Some methods covered in Geography 226 will be reviewed so as to set the stage for examining new methods.

1. Analysis of Means – Arithmetic, Geometric and Harmonic means
    - Two Sample t-test, Mann Whitney U
    - One Way ANOVA, Kruskal-Wallis ANOVA
    - Paired t-test, Repeated Measures ANOVA
    - Two Way ANOVA
  2. Correlation – bivariate and partial
  3. Regression
    - Simple linear
    - Dummy variables
    - Modelling departures from a straight line
    - Multiple regression – model building, multicollinearity, heteroscedasticity.
  4. Logistic Regression – Binary
  5. Principal Components and/or Cluster Analysis
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## EVALUATION

Lab Exercises	48% (8 in total)
Research Paper	22% + Class Presentation 5%
Final Exam	25% (two hour period)

## GRADING SYSTEM

As per the Academic Calendar:

Grade	Grade point value	Grade scale	Description
A+	9	90-100%	<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.
A	8	85-89%	
A-	7	80-84%	
B+	6	77-79%	<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	5	73-76%	
B-	4	70-72%	
C+	3	65-69%	<b>Satisfactory, or minimally satisfactory.</b> These grades indicate a satisfactory performance and knowledge of the subject matter.
C	2	60-64%	
D	1	50-59%	<b>Marginal</b> Performance. A student receiving this grade demonstrated a superficial grasp of the subject matter.
F	0	0-49%	<b>Unsatisfactory</b> 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.

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## GEOGRAPHY DEPARTMENT INFO

- Geography Department website: [uvic.ca/socialsciences/geography/](http://uvic.ca/socialsciences/geography/)
- Undergraduate Advising: [geogadvising@uvic.ca](mailto:geogadvising@uvic.ca)

## COURSESPACES

Lecture notes, readings and lab assignments.

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## POLICY ON LATE ASSIGNMENTS

Assignment will not be marked if over one week late.

## 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)

If you have any questions or doubts, talk to me, your course instructor. For more information, see [uvic.ca/learningandteaching/cac/index.php](http://uvic.ca/learningandteaching/cac/index.php).

## **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 ([uvic.ca/services/cal/](http://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.

## WEEKLY CALENDAR

WEEK	DATE	
1	Sept 13	Intro to MINITAB
2	20	Analysis of Means and Medians
3	27	ANOVA – Two Way, Repeated Measures
4	Oct 4	Correlation - OLS
5	11	Regression - Curves
6	18	Regression – dummy variables
7	25	Multiple Regression
8	Nov 1	Multiple Regression
9	8	Logistic Regression
10	15	Cluster Analysis
11	22	<b>READING BREAK</b>
12	29	PCA
13	Dec 6	<b>Presentations</b>

### 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)