

GEOG/EOS 230

Introduction to Environmental Data Analysis

Spring 2024

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We acknowledge and respect the l k n peoples on whose traditional territory the university stands and the Songhees, Esquimalt and WSÁNE

Instructors: David Atkinson

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Lab Instructor (TA): Vida Khalilian
TA office hours: to be announced

Atkinson office hours: Tues 13:00-14:00 and Wed 13:00 – 14:00,
or by appointment (email me)

Introduction:

This course provides students with the fundamental skills and knowledge required to analyze environmental data. Students will learn statistical methods, data visualization techniques, and gain hands-on experience using the python programming languages for environmental data analysis. The course will cover various types of environmental data, including climate data, pollution data, hydrological data and ecological data. We will work in the context of modern data distribution portals, with climate-change.ca forming the primary source of information.

Course Mission:

This course seeks to equip you with an understanding of how to bring data into a computer and reduce it to a form suitable to answer questions.

Learning Objectives:

1. How to recognize different data types and recognize what options are available for examining the data.
2. How to prepare data for ingest and then how to examine it after performing the initial read.
3. Different ways to present summaries.
4. Considerations for time series and spatial data.
5. Begin learning and using the Python language.

Tutorials:

This course has a computer tutorial component that will emphasize the ingest and analysis of data using a programming language called Python. Data will be gathered primarily from the Government of Canada's climate change data portal: <https://climate-change.canada.ca/climate-library> Analyses will be directed to support conclusions/decisions concerning applied climate scenarios and problems that are presented. They are an essential part of the course and **attendance is required**. There will be reports due: see below for detailed schedule. All reports must be neatly typed and figures must be cleanly and correctly presented. You will be provided with an example and rubric for each tutorial writeup.

There is a lot of tutorial material on Python that I strongly urge you to spend time at the beginning of term working through to gain proficiency with this system. Preparing synthesis reports is a major skill

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Evaluation: The course grade will be based on the following:

		Date (if applicable)	Weight	Subject
1	Final test	Listed below	15 %	First two sections (processes)
			15 %	Third section (applications) ALL LABS COVERED
	Presentation	Last two classes	10%	You decide
3	Tutorials	Detailed breakdown to follow	45 %	Varied

Course outline

This is our objective but topics may be shuffled a bit as we progress. **Midterm date is firm.**

Lect #	Wk	Date	Lecture Subject	Tutorial	Due dates
1	1	M Jan 08	Class overview, Intro to analysis, computers	none	
2	1	Th Jan 11	OS, FS, representation, ascii	none	
3	2	M Jan 15	Data types: human readable + markup	1	
4	2	Th Jan 18	Data types: commercial, machine read...	1	
5	3	M Jan 22	Computer languages		
6	3	Th Jan 25	Regex ingest, assessment		
7	4	M Jan 29	Initial data ingest, Exploratory analysis, dates		
8	4	Th Feb 01	Data cleaning		
9	5	M Feb 05	Data presentation: tables and Plot types		
10	5	Th Feb 08	Stats - descriptive		
11	6	M Feb 12	Stats - inferential		
12	6	Th Feb 15	Stats - hypothesis testing		
13	7	M Feb 22	Reading break		
14	7	M Feb 26	midterm	3	midterm
15	7	Th Feb 29	Other statistical approaches - clustering	3	
16	8	M Mar 04	Time series data, dates		
17	8	Th Mar 07	Time series data, plotting considerations		
18	9	M Mar 11	Regression		
19	9	Th Mar 14	Regression		
20	10	M Mar 18	Spatial data- types	5	
21	10	Th Mar 21	contouring and visualizing	5	
22	11	M Mar 25	spatial stats	5	
23	11	Th Mar 28	mapping concepts	5	
24	12	M Apr 01	Easter, University closed	none	
25	12	Th Apr 04	Presentations		
26	13	M Apr 08	Presentations		23 1
27	13	Th Apr 11	classes are finished	-	- 1

Note that both the tutorial section and the theory section need to be passed to pass the course

Other information:

Undergraduate Grading**

*Passing
Grades*