GEOG 373

Applied Climatology

Fall 2024

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

If you are not on these lands, give a thought to where you are now and those who have lived there in long years past, and still live there now, and how they achieve balance with their environment.

Classes

Tuesday, Wednesday and Friday, 10:30 – 11:20 Clearihue Building A208

Labs

(Section B01): Wednesdays 12:30 – 14:20 David Turpin Building (DTB) A251

(Section B02): Thursdays 10:30 – 12:20 David Turpin Building (DTB) A253

Instructor: Adam Wicks awicks@uvic.ca	Office Hours: Wednesdays 9:30 – 10:30 or by appointment
Lab Instructors (TA): Osamu Kabayama okabayama@uvic.ca Neil Brubacher nbrubacher@uvic.ca	 Office Hours: To be announced Office Hours: To be announced

Introduction

“A study of the application of physical principles to practical problems in climatology and the reciprocal interaction between climate and human activities. Topics include: urban effects on climate; air pollution; human bioclimatology; agricultural climatology; and methods of microclimatic modification.” – from the on-line course description

Explicit consideration and inclusion of weather and climatic concepts into planning is essential in many sectors. One can imagine setting up a farm – the general climatic setting will entirely dictate the types of crops that can be grown. The general idea is so obvious you don’t even think about it – e.g., you are not going to grow pineapples in the Prairies – yet to get at specifics a process of analysis is necessary. This can be a very detailed process that requires careful thought. To continue with the agriculture example, if the climatic analysis work has not already been performed, then data to describe the area climate are required and must be secured. The type of data must be considered. The form the data are in – what type of data file, what is its structure – must be dealt with. Then the data must be analyzed for errors and then “reduced” using statistical approaches to the form required to answer the questions at hand. Non-meteorological factors must also be considered, for example, the orientation of a slope which will determine local precipitation and radiation departures from a regional average that you may calculate from some weather station several kilometers away.

This course takes the next step in the weather and climate overview that you received in GEOG272 and GEOG103. Using concepts developed in that course, GEOG373 moves on to determine how they can be more directly applied to many questions in daily life. The mechanisms by which these sorts of analyses are conducted are also covered. There is a mandatory text. Readings from the text and elsewhere will be regularly assigned. The course will generally follow these readings, and you should keep up with them. In class we will emphasize certain topics.

Course Mission

This course seeks to equip you with an understanding of how climate acts at the regional scale and how it interacts with other natural and human parameters/features to allow you to:

utilize computer analyses and tools to answer to manipulate data to help you answer questions about how climate affects certain sectors, and

think about various spheres of human and natural systems and understand how weather and climate act to influence.

Learning Objectives

1. Identify the basic climate controls, large-scale and small-scale, that act upon a given location.
2. Explain how these climate controls work to create a local-scale climate.
3. Be aware of various quality-control issues to be alert for when working with data.
4. Analyze and/or present data using a sophisticated programming language (Python).
5. Gain familiarity with how climate intersects human activities in several sectors (eg transport, agriculture, hydrology).

Laboratories

This course has a computer laboratory component that will emphasize the ingest and analysis of data using a programming language called Python. Data 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 lab reports must be neatly typed and figures must be cleanly and correctly presented. In particular, labs will give you practice dealing with data (brining it in, preparing it for analysis, and preparing summary plots/tables/statistics) using Python programming language. 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 needed in today's job market. Analysis and presentation of data is a necessary skill in all fields.

** Labs are due before the start of the next new lab.

> For example, for section B01 (B02), lab “Python 1” would be due before your “Python 2” Lab starts on Sept 25 (26).

** You have a lot of time for these labs. Plan your time wisely because we won’t entertain last minute pleas for extensions. Even if something serious comes up in the day or two before lab is due, the majority of it should already be finished. -10% per day late.

Online Learning: This course is hosted on the UVic Brightspace system. http://bright.uvic.ca/ You will find the course and lab zoom link and all course materials at your 373 Brightspace site.

Textbooks

Carrega, Pierre (ed.). 2010. Geographical Information and Climatology. Wiley Press.

This explores the integration between applied climatology and the use of GIS tools. It is quite motivating and the book covers a lot of interesting ground that will be of benefit to you.

Other readings from the textbook by Aguado and Burt that cover some of the physical process gaps in Carrega will be assigned and provided by me.

Please read the material from the text. Lecture material will generally follow the readings. All readings are testable.

Computer use

In the laboratories, we will be doing exercises using the computer using the Python programming language. You should be familiar with basic computer skills such as file maintenance and word processing. You won’t need to install python locally on your own computer. We will show you how to access the online Google Collaboratory in the first week. The labs are set up assuming you don’t know anything about programming.

Evaluation

The course grade will be based on the following:

		Date	**Weight**	**Subject**
1	Midterm	Friday October 11th	20 %	First two Modules (Processes and Information)
2	Final Exam	Will be posted	35 %	Third Module (Application) Some Lab concepts included
3	Labs	Python 1 (8%) Sept 25/26 Python 2 (8%) Oct 16/17 Python 3 (9%) Oct 30/31 Python 4 (9%) Nov 20/21 Python 5 (11%) Dec 4/5	45 %	Varied

** As per university regulations, the theory component and lab component must both be passed to pass the course.

Tests and Exam

There is one test during term and one final in the final exam period (schedule for that is not in the instructors' control). The test covers the first two, smaller sections of the course. The final exam is *not* cumulative and will cover the final, larger unit (applications) and it will include some materials from labs. It will be 3 hours in duration. Further details will be discussed in class. The requirements for the labs will be presented in lab handouts as the term progresses. You will never be tested on coding or knowing specific bits of python code.

Course Outline

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

Wk	Date	Lecture Subject	Lab	Module
1	T Sep 3	No class	No Lab	Process
	W Sep 4	Course intro and structure – concept map presentation		
	F Sep 6	Radiation		
2	T Sep 10	Pressure and winds	Python 1: Intro, Temperature Plots - Urban Heat Island	
	W Sep 11	Storms: Tropical Cyclone, MCS, tornado		
	F Sep 13	Storms: Extra-tropical Cyclones, advection		
3	T Sep 17	Local modifiers: radiation, T modifiers		
	W Sep 18	Local modifiers: winds, precip		
	F Sep 20	other factors beyond meteorology		
4	T Sep 24	Data gathering	Python 2: Probability Density Function – Equipment Maintenance	Information
	W Sep 25	The weather process, weather agencies		
	F Sep 27	Data analysis I – linear stats, error, extremes		
5	T Oct 1	Data analysis II – spatial- contouring, stats		
	W Oct 2	Scale concepts		
	F Oct 4	Modeling: statistical and empirical models		
6	T Oct 8	Modeling: numerical and topoclimate models	Midterm Week: No Lab	
	W Oct 9	IPCC		
	F Oct 11	**MidTerm**		
7	T Oct 15	Northern context: Northwest passage	Python 3: Linear Regression - Sea Ice Trends	
	W Oct 16	Industry – Arctic shipping		
	F Oct 18	Transportation – general		
8	T Oct 22	Industry – forestry		
	W Oct 23	Wildfire		
	F Oct 25	Wildfire		
9	T Oct 29	Indigenous knowledge integration	Python 4: Quantile-Quantile Plots – Flood Return Interval	Application
	W Oct 30	Indigenous weather impacts		
	F Nov 1	Urban		
10	T Nov 5	Urban		
	W Nov 6	Urban		
	F Nov 8	Engineering Considerations		
11	T Nov 12	Reading break – no class	Reading Break: No Labs	
	W Nov 13	Reading break – no class		
	F Nov 15	No class – enjoy your week		
12	T Nov 19	Hydrology	Python 5: Local Weather Analysis - Rain Spatial Distribution	
	W Nov 20	Hydrology		
	F Nov 22	Guest Lecture: Daniel Brendle-Moczuk – plastics pollution		
13	T Nov 26	Agriculture		
	W Nov 27	Agriculture		
	F Nov 29	Guest Lecture: Mitch Rawlyk – advanced micro-agriculture		
14	T Dec 3	Human comfort	No Lab	
	W Dec 4	Human comfort		
	F Dec 6	No class; classes are finished		

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/calendar/undergrad/info/regulations/academic-integrity.html

If you have any questions or doubts, please speak to me. For more information, see 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/). 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 Resource Office (SVRO)

If you have been directly or indirectly impacted by sexualized violence, reach out to the SVRO for information, advice, resolution options (restorative and disciplinary) as well as support options and referrals. The SVRO is both survivor-centred and trauma-informed in their approach.

eqhr01@uvic.ca

Sedgewick C Wing

www.uvic.ca/svp

Equity and Human Rights (EQHR)

UVic Equity and Human Rights is a resource for students, staff and faculty who have experienced discrimination and harassment and are looking for informal and formal resolution options as well as advice, coaching and/or education. We are available for confidential consultations so that you can ask questions and learn your options.

eqhr01@uvic.ca

Sedgewick C Wing

www.uvic.ca/equity

Resources for International Students

The University of Victoria offers a number of resources to support international students as they pursue their studies. UVic's International Centre for Students is the primary office supporting international students on campus at the university-wide level and provides various supportive program through the UVic Global Community Initiative, including a Mentorship Program and Conversation Partner Program. For academic advising-related questions, students in the Geography Department are also encouraged to meet with the Geography Undergraduate Advisor (geogadvising@uvic.ca) as well as an academic advisor in the Academic Advising Centre early in their studies to help map out a plan to declare a major and complete university program requirements. Other resources include the Centre for Academic Communication and the Math and Stats Assistance Centre. International students are also encouraged to contact the International Student Liaison in Geography (Prof. CindyAnn Rose-Redwood, cindyann@uvic.ca), who can assist in making connections with other international and domestic students in the Geography Department and share opportunities for getting involved in departmental activities more broadly.

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 online 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/

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

Undergraduate Grading**

Passing Grades	Description
A+ A A-	**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-	**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	**Satisfactory**, or **minimally satisfactory**. These grades indicate a satisfactory performance and knowledge of the subject matter.
D+ D	**Marginal** performance**.** A student receiving this grade demonstrated a superficial grasp of the subject matter.
F	**Unsatisfactory** performance. Wrote final examination and completed course requirements; no supplemental.
N	Did not write examination or complete course requirements by the end of term or session; no supplemental.

A+	A	A-	B+	B	B-	C+	C	D	F	N
9	8	7	6	5	4	3	2	1	0	0
90-100%	85-89%	80-84%	77-79%	73-76%	70-72%	65-69%	60-64%	50-59%	49% or Less	49% or Less

** As stated in the 2009-2010 Calendar

Geography Department Info

Geography Departmental web site: https://www.uvic.ca/socialsciences/geography/

Geography planning guide: Plan Your Geography Program

Geography Department Chair: geogchair@uvic.ca

Geography Undergraduate Advising: geogadvising@uvic.ca

And Check out SOGS, the GEOGRAPHY student undergraduate society!