

GEOG 408 LEC 01 Meteorology and Hydrology Winter 2022 classes: January 10th – April 12th, 2022
GFC HOURS (3-2)

Section	Days	Time	Location
LEC 01	TR	15:30-16:45PM	ES 443 *online Jan 10-31
Lab 01	M	9:00-10:50AM	ES 355 in person
Lab 02	T	8:00-9:50AM	ES 355 in person
Lab 03	T	11:00-12:50PM	ES 355 in person

Instructor: Tricia Stadnyk	Office: ES 458
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Email communication will be through your UCalgary email address.	Office hours: TBD, 1 hr/week

The **Department of Geography** condemns the longstanding and continued injustices against those marginalized by racism, sexism, homophobia, transphobia, classism, xenophobia, able-bodied normativity, mental health profiling, and other forms of prejudice. We are pained by the fact that injustices are unevenly borne. <https://arts.ucalgary.ca/news/anti-racism-statement>

Territorial Acknowledgement

The Department of Geography would also like to acknowledge the traditional territories of the people of the Treaty 7 region in southern Alberta. The City of Calgary is also home to Métis Nation of Alberta, Region III. <https://www.ucalgary.ca/indigenous/cultural-protocol>

Official Course Description

Atmospheric connections with the hydrological cycle, including evapotranspiration, water vapour, stability, cloud development, and precipitation. Water transport is followed through soil moisture, groundwater, and stream flow. Discussed methods focus on tracking water transport through the land-atmosphere system at various scales. Additional topics may include water quality, water resource management, and hydrology of selected landscapes.

Course Objectives

Students in this course will learn how to:

1. Understand atmospheric circulation, and the fundamental properties of atmospheric moisture.
2. Understand, analyze, and track the movement of water through evaporation, cloud formation, and precipitation.
3. Understand the hydrologic cycle and the water balance equation as a framework for studying and managing freshwater.
4. Apply various techniques to measure, model, or calculate rainfall-runoff, river flow and reservoir outflow.
5. Build and apply a basic hydrologic simulation model for hydrologic prediction.

Course Learning Outcomes

The Department of Geography is committed to student knowledge and skill development. The table below lists the key learning outcomes for this course, the program-learning outcomes to which they contribute, and the expected level of achievement.

Course Learning Outcomes	PLO(s)*	Level(s)**
Students should be able to explain global weather patterns	2	3
Students will be expected to solve quantitative problems through selection and manipulation of the relevant equations and basic spreadsheet skills	4,7	2
Students should be able to apply knowledge about the water cycle and water resources into other undergraduate courses and workplace responsibilities	2,5	2
Students should be able to explain the weather and hydrologic conditions they are currently experiencing, wherever in the world they find themselves	5	1
Distinguish between natural reservoirs of freshwater on earth, and factors affecting freshwater movement and distribution and availability	2	2
Describe the impacts of climate change on freshwater distribution	7	2

*PLOs = Program Learning Outcomes: 1 = reflect and communicate diverse human-environment perspectives, 2 = identify and explain human-environment processes, 3 = implement sampling, data collection, analyses and communication methods, 4 = analyze spatial and temporal aspects of human-environment systems, 5 = employ knowledge, arguments, and methodologies for solving human-environment problems, 6 = evaluate geospatial data and manipulate it to create cartographic products, 7 = communicate geographic concepts using oral, written, graphic, and cartographic modes, and 8 = demonstrate literacy skills.

**Levels: 1 = Introductory, 2 = Intermediate, and 3 = Advanced.

Prerequisites

3 units from GEOG 211, 308

Recommended basic level of math and familiarity with Excel spreadsheets and basic computations in Excel. You will need access to a personal computer to download and view course materials, complete labs and assignments, and for submission of deliverables. There will be two computer-based labs that can be completed on home desktops but will require you to download software (HEC-HMS, a hydrologic model). Unfortunately, this software is not available for mac platforms and will require a Windows operating system or emulator. For Apple Mac users, it may be possible to install the Windows operating system on a Mac computer using either Apple's [Boot Camp](#) or a commercial virtualization client, such as [Parallels Desktop](#) or [VMware Fusion for Mac](#), although these options are supported by the University of Calgary, and students must obtain and install necessary software themselves (student discounts are often available to offset the cost of purchasing commercial virtualization software and a license for the Windows operating system). Interested students are advised to contact their instructor for more information. Assignments will also require you to have access to Microsoft® Office products, specifically Excel and Word.

Course Format

Course format for the W2022 season will be in-person delivery of lectures and labs. Attendance to laboratory sessions is mandatory. Online materials will be provided through the D2L LMS, including access to lecture material (course notes only), online (zoom) office hours, and digital communications through SLACK (for student support). All course deliverables will be submitted online, through the D2L LMS, with evaluations also returned online; midterm and final exams will be **online** format.

Given COVID-19 protocols, provisions will be available in the event of illness for all in-person course components (e.g., laboratories). The student must notify the TA in charge and instructor in the event of an illness or exceptional circumstance that prevents in-person attendance.

Learning Resources

All course materials required will be disseminated through the D2L learning management system (LMS). There is no required textbook for this course, however, there are several texts that are recommended, and that will have "recommended readings" posted to supplement lecture material taught in the course. Some highly relevant chapters will be provided by the instructor through D2L.

Weather & Climate: An Introduction. Ed Ross, Sheila Loudon. Oxford University Press, 2013. ISBN-10 0195445872, ISBN-13 978-0195445879. https://books.google.ca/books?id=7HtEMQAACAj&source=gbs_book_other_versions

Hydrology & Floodplain Analysis, 6th Ed. Bedient, Huber & Vieux. Pearson 2019. ISBN-10 0134751973, ISBN-13 9780134751979.

<https://books.google.ca/books?id=48t7tAEACAj&dq=bedient+huber+and+vieux&hl=en&sa=X&ved=2ahUKEwio0o30-aLsAhXPJDQIHUoEBjAQ6AEwAXoECAAQAg>

Physical Hydrology (3rd Edition), by S. Lawrence Dingman:

https://books.google.ca/books/about/Physical_Hydrology.html?id=rUUaBgAAQBAJ&redir_esc=y

Assessment Methods

It is essential to pass all elements/components to pass the course as a whole. Numbers in brackets indicate the number of deliverables equally weighted to determine the final assessment component.

Lab reports (5)	35
HEC-HMS Computer Labs (2)	10
Assignments (5)	15
BINGO Challenge (5)	5
Midterm (1)	10
Final Exam (comprehensive) (1)	20
Final Exam (take-home) (1)	5
Total	100

Late Policy: Deliverables submitted after the stated deadline will be penalized at -10% for each day late (including weekends). Exceptions to this policy must be discussed and confirmed with the lead instructor in advance of the due date. If a student fails to complete a deliverable for legitimate reasons (as determined by the course instructor), an alternative course of action must be discussed with the lead instructor or course assistant in a timely fashion and documentation will be required as per the University Calendar.

Grading System

92 – 100	A+	73 – 75	B	59 – 61	C-
85 – 91	A	69 – 72	B-	55 – 58	D+
80 – 84	A-	65 – 68	C+	50 – 54	D
76 – 79	B+	62 – 64	C	0 – 49	F

Lab Reports (35%)

There will be a series of 5 lab reports worth 35% of your mark total. This course involves hands-on experimental labs (EL) that will be held IN PERSON, which will be conducted in teams (groups of 3-4), during specified intervals within the lab section times. Attendance at these laboratory sessions is a mandatory part of the course; alternative arrangements will be made in the event of illness in accordance with COVID-19 protocols.

COVID-19 protocols will be in place to ensure student/instructor/TA safety, including:

- Labs will be conducted in smaller than normal groups (3 students or less compared to 5)
- Lab groups will be maintained throughout the term, meaning the same group of students will be working together at all times
- Instructors/TA(s) will demo the experiments while socially distanced from students, with short videos posted and to be reviewed prior to the lab session
- Groups will be assigned separate times within their lab periods where their team, and only their team, show up to complete the hands-on portion of the lab. It is critical for lab groups to be on-time or they risk not having adequate time for completion.
- Doors will be left open to maintain air circulation, and masks will be mandated according to U Calgary COVID policies.
- Analyses (week 2 of every lab) can be conducted through online group meetings/chats and additional office hours with the TAs/instructor

Lab write-ups will be group assignments, required for each experimental lab (EL). Students/lab teams are permitted to collaborate on labwork for this course, however, each team must hand in an individual assignment that reflects their own work, analyses and interpretation of the results. Given the numerical nature of many of the assignments, this can lead to some confusion regarding plagiarism. In written questions, it is easy to ensure that responses are written “in your own words”. For mathematical problems, this can be more difficult; often there is only one correct approach to a question, and limited ways to express that approach in an assignment. In general, it is okay if two students’ hand in very similar answers to mathematical questions, provided they each did the work themselves. The line is quite clear: there should be no digital

files transferred between students. You must cite or acknowledge any student(s) you collaborate with. All lab reports and accompanying material (calculations) must be submitted in a D2L compatible format (i.e. .pdf, .docx or .xlsx).

Students will have two weeks to view the lab demo and complete their lab reports.

HEC-HMS Models (10%)

Throughout the term, you will learn to use the HEC-HMS hydrologic model, which applies all concepts taught in this course to build a simulation of rainfall-runoff. During the term, you will complete two assignments requiring you to build and apply HEC-HMS models for hydrologic assessment. These will be worth 5% each of your final mark and will assist you in preparing for your take-home final exam. These are individual assignments; Students will have ~2 weeks to complete assignments from the time they are posted.

Assignments (15%)

Assignments, or problems sets will be posted approximately every two weeks in this course for a total of 5 deliverables and are designed to help reinforce numerical concepts required for the exams. These are individual deliverables; Students will have ~2 weeks to complete assignments from the time they are posted.

BINGO Challenge (5%)

Each student must complete a set of 5 BINGO challenge cards, worth 1% of your mark for each card, throughout the term. At least five of the seven cards posted on D2L must be handed in and marked for completion (CR/no CR), with FOUR of the five related to a specific topic/module of the course. Students may choose to complete all seven cards, with bonus marks being added to your final mark (1% per additional card submitted). Each challenge requires a student to complete “4 challenges in a row” (horizontal, vertical or diagonal), submitting proof of the completed challenge as requested on the card (e.g., photos, GPS coordinates, descriptions, etc.). These challenges are designed to provide tangible learning opportunities - a chance to observe hydrology and meteorology around you!
BINGO challenges are due on (Apr 1, 2022).

Midterm (10%) & Comprehensive Final Exam (20%)

Exams will be open-book, 120-minute online tests. The final exam will be scheduled by the registrar but will be online due to COVID-19 protocols. The exams will be available for a 24-hour period, prior to the exam end date. The midterm will be offered during the 8th week of class (Mar 1, 2022), and the comprehensive final exam will be during the exam period (Apr. 19-29th, 2022) as scheduled by the registrar.

If a student is unable to write the midterm test for medical or compassionate reasons, the weight of the term test will be added to the final examination component of the evaluation. A student who is unable to write the midterm/final examination test(s) must inform the instructor before the start of the test.

Take-home Final Exam (5%)

On the final day of classes, students will be assigned a take home final exam in which they must build a HEC-HMS model based on custom inputs. Students will be required to justify their choices in constructing the model (e.g., selection of equations and parameters), and will be required to provide output of their working model design (i.e., resulting hyetograph and hydrographs). For this exam, and lab assignments throughout the term, it is a requirement for you to download and install for use the HEC HMS hydrologic model from the U.S. Army Corps of Engineers (<https://www.hec.usace.army.mil/software/hec-hms/>). *Please note it cannot be run on a tablet or mac ios.*

Additional Course Information

In the event that a student misses a midterm or any course work due to illness, supporting documentation, such as a medical note or a statutory declaration may be requested <https://www.ucalgary.ca/pubs/calendar/current/m-1.html>
Please refer to <https://www.ucalgary.ca/registrar/registration/appeals/student-faq> for frequently asked questions concerning the provision of a medical note/statutory declaration.

Exams & Deferrals <https://www.ucalgary.ca/registrar/exams>

Supplementary Fees

A supplementary fee related to bus transportation for a course field trip will be required.

Referencing Standard

In written work presented in this class, the accepted method for referencing the work of others will be the Chicago Manual of Style: <https://www.chicagomanualofstyle.org/home.html>

Important Dates

The last day to drop this course and receive a tuition fee refund is **Thursday, January 20th, 2022**. The last day to withdraw from this course is **Tuesday, April 12th, 2022**. No classes February 20 – 26th, 2022.

For additional detailed course information posted by the instructor, visit the course Desire2Learn page online at <https://d2l.ucalgary.ca/d2l/home>.

Writing support

Please note writing support resources provided by the Student Success Centre <https://ucalgary.ca/ssc/resources/writing-support> and the library <https://library.ucalgary.ca/guides/writinghelp>

University of Calgary Academic Integrity Policy

Academic integrity is the foundation of the development and acquisition of knowledge and is based on values of honesty, trust, responsibility, and respect. We expect members of our community to act with integrity. The University Calendar includes a statement on the principles of conduct expected of all members of the university community (including students, faculty, administrators, any category of staff, practicum supervisors, and volunteers), whether on or off university property. This statement applies in all situations where members of the university community are acting in their university capacities. All members of the university community have a responsibility to familiarize themselves with the principles of conduct statement, which is available at: www.ucalgary.ca/pubs/calendar/current/k.html.

Plagiarism, Cheating, and Student Misconduct

The University of Calgary is committed to the highest standards of academic integrity and honesty. Students are expected to be familiar with these standards regarding academic honesty and to uphold the policies of the University in this respect.

Academic dishonesty is not an acceptable activity at the University of Calgary, and students are **strongly advised** to read the Student Misconduct section in the University Calendar at: www.ucalgary.ca/pubs/calendar/current/k-3.html. Often, students are unaware of what constitutes academic dishonesty or plagiarism. The most common are (1) presenting another student's work as your own, (2) presenting an author's work or ideas as your own without adequate citation, and (3) using work completed for another course. Such activities will not be tolerated in this course, and students suspected of academic misconduct will be dealt with according to the procedures outlined in the calendar at: <https://www.ucalgary.ca/legal-services/university-policies-procedures/student-academic-misconduct-procedure>

For students wishing to know more about what constitutes plagiarism and how to properly cite the work of others, the Department of Geography recommends that they attend Academic Integrity workshops offered through the Student Success Centre: <https://www.ucalgary.ca/student-services/student-success/learning/academic-integrity>

Instructor Intellectual Property

Information on Instructor Intellectual Property can be found at <https://www.ucalgary.ca/legal-services/university-policies-procedures/intellectual-property-policy>

Freedom of Information and Protection of Privacy

Freedom of Information and Protection of Privacy (FOIP) legislation in Alberta disallows the practice of having students retrieve assignments from a public place, such as outside an instructor's office, the department office, etc. Term assignments will be returned to students individually, during class or during the instructor's office hours; if students are unable to pick up their assignments from the instructor, they must provide the instructor with a stamped, self-addressed envelope to be used for the return of the assignment.

Posting of Grades and Picking-up of Assignments

Graded assignments will be returned by the instructor or teaching assistant personally during scheduled lecture or laboratory periods, unless they are made available electronically through the course D2L webpage. Grades and assignments will not be available at the Department of Geography's main office and assignments cannot be dropped off at the Department Office. All assignments, labs and other deliverables will be submitted electronically unless otherwise noted.

Academic Accommodations

It is the student's responsibility to request academic accommodations, according to the university policies and procedures listed in the University Calendar.

The student accommodation policy can be found at: <https://www.ucalgary.ca/pubs/calendar/current/b-6-1.html>

Students needing an accommodation because of a disability or medical condition should communicate this need to Student Accessibility Services in accordance with the Procedure for Accommodations for Students with Disabilities: <https://www.ucalgary.ca/legal-services/university-policies-procedures/accommodation-students-disabilities-procedure>

Students needing an accommodation based on a protected ground other than disability should communicate this need, preferably in writing to their instructor or the Department Head (email: freeman@ucalgary.ca).

Online courses

Course notes (lecture material) will be provided electronically through the D2L LMS. Students are expected to attend all laboratory sessions IN-PERSON, however, to complete this course successfully.

Learning Technologies and Requirements

In order to successfully engage in their learning experiences at the University of Calgary, students taking online, remote and blended courses are required to have reliable access to the following technology.

- A computer with a supported operating system, as well as the latest security and malware updates
- A current and updates web browser
- Webcam (built in or external)
- Microphone and speaker (built in or external) or headset with microphone
- Broadband internet connection
- HEC-HMS hydrologic model (<https://www.hec.usace.army.mil/software/hec-hms/downloads.aspx>)
- Microsoft Office (Word and Excel)

Use of internet and electronic devices in class

Respect for the learning environment of you and your classmates is paramount. Therefore, I ask that laptops, mobile devices or other electronic devices are used appropriately – for classwork only – and will not be permitted if they become a distraction (i.e., the instructor will remove them or ask you to leave).

Guidelines for Zoom Sessions

Zoom is a video conferencing program that will allow us to meet at specific times for a "live" video conference, so that we can have the opportunity to meet each other virtually and discuss relevant course topics as a learning community. Zoom will be used to support office hours in this course.

To help ensure Zoom sessions are private, do not share Zoom link or password with others, or on any social media platforms. Zoom links and passwords are only intended for students registered in the course. Zoom recordings and materials presented in Zoom, including any teaching materials, must not be shared, distributed or published with the instructor's permission.

The use of video conferencing programs relies on participants to act ethically, honestly and with integrity; and in accordance with the principles of fairness, good faith and respect (as per the [Code of Conduct](#)). When entering Zoom or other video conferencing sessions (such as MS Teams), you play a role in helping create an effective, safe and respectful learning environment.

Please be mindful of how your behavior in these sessions may affect others. Participants are required to use names officially associated with their UCID (legal or preferred names listed in the Student Centre) when engaging in these activities. Instructors/moderators can remove those whose names do not appear on class rosters. Non-compliance may be investigated under relevant University of Calgary conduct policies (e.g. Student Non Academic Misconduct Policy). If participants have difficulties complying with this requirement, they should email the instructor of the class explaining why, so the instructor may consider whether to grant an exception, and on what terms. For more information on how to get the most out of your Zoom sessions visit:

<https://elearn.ucalgary.ca/guidelines-for-zoom/>.

If you are unable to attend a Zoom session, please contact your instructor to arrange an alternative activity for the missed session (e.g., to review a recorded session). Please be prepared, as best as you are able, to join class in a quiet space that will allow you to be fully present and engaged in Zoom sessions. Students will be advised by their instructor when they are expected to turn on their webcam (for group work, presentations, etc.).

The instructor may record online Zoom class sessions for the purposes of supporting student learning in this class – such as making the recording available for review of the session or for students who miss a session. Students will be advised before the instructor initiates a recording of a Zoom session. These recordings will be used to support student learning only and will not be shared or used for any other purpose.

Course evaluations and student feedback

Continuous feedback is highly encouraged and welcomed in this course. The instructor will conduct no less than one formative feedback assessment during the term, providing students the opportunity to provide critical feedback that will be used to adjust learning goals, deliverables and modes of delivery. If necessary, more than one formative feedback will be used to collect student input. Student feedback will be sought at the end of the course through the standard University Student Ratings of Instruction (USRI) and Faculty course evaluation forms.

Accessibility

All lecture materials will be provided online, through the D2L LMS, in digital format (PDF files). Video recordings of lectures will NOT be available, unless there is a required (mandated) switch to online lectures.

Copyright Legislation

All students are required to read the University of Calgary policy on Acceptable Use of Material Protected by Copyright <https://www.ucalgary.ca/legal-services/university-policies-procedures/acceptable-use-material-protected-copyright-policy> and requirements of the copyright act (<https://laws-lois.justice.gc.ca/eng/acts/C-42/index.html>) to ensure they are aware of the consequences of unauthorised sharing of course materials (including instructor notes, electronic versions of textbooks etc.). Students who use material protected by copyright in violation of this policy may be disciplined under the Non-Academic Misconduct Act.

Wellness and Mental Health Resources

The University of Calgary recognizes the pivotal role that student mental health plays in physical health, social connectedness, and academic success and aspires to create a caring and supportive campus community where individuals can freely talk about mental health and receive supports when needed. We encourage you to explore the mental health resources available throughout the university community, such as counselling, self-help resources, peer support, or skills-building available through the SU Wellness Centre (Room 370, MacEwan Student Centre, <https://www.ucalgary.ca/wellnesscentre/services/mental-health-services>) and the Campus Mental Health Strategy website (<http://www.ucalgary.ca/mentalhealth/>).

Students requiring assistance are encouraged to email the **Student at Risk line** if they or others appear to need wellness assistance: sar@ucalgary.ca For more immediate response, please call: 403-210-9355 and select option #2.

Sexual Violence Policy

The University recognizes that all members of the University Community should be able to learn, work, teach and live in an environment where they are free from harassment, discrimination, and violence. Please see the policy available at <https://www.ucalgary.ca/policies/files/policies/sexual-violence-policy.pdf>

Contact Information for Student and Faculty Representation

- Student Union VP Academic 403-220-3911, suypaca@ucalgary.ca
- Students Union Representatives for the Faculty of Arts – 403-220-3913, arts1@su.ucalgary.ca, arts2@su.ucalgary.ca, arts3@su.ucalgary.ca, arts4@su.ucalgary.ca
- Student Ombuds Office information can be found at: www.ucalgary.ca/ombuds/

Emergency Evacuation/Assembly Points

Assembly points for emergencies have been identified across campus. Assembly points are designed to establish a location for information updates from the emergency responders to the evacuees; from the evacuated population to the emergency responders. For more information, see the University of Calgary's Emergency Management website: <https://www.ucalgary.ca/risk/emergency-management>. Muster point is the ICT food court.

Campus Safewalk

Campus Security, in partnership with the Students' Union, provides the Safewalk service, 24 hours a day, to any location on Campus, including the LRT station, parking lots, bus zones, and university residences. Contact Campus Security at 220-5333 or use a help phone, and Safewalkers or a Campus Security officer will accompany you to your campus destination.