

GEO 105 LAB: Earth, Environment, And Climate Lab
Scientific Literacy & Inquiry Sequence

COURSE INFORMATION

Session: **Spring 2020** Classroom: Wilkeson 135 and the GIAL
 Credit Hours: **1** Class time: **Varies by section, check HUB**
 Instructor: See contacts section in *UBlearns* for TA information (including office hours and office location).

COURSE DESCRIPTION

This course explores how scientific methods are employed to understand and manage earth, environment, and climate systems. These goals will be reached through weekly laboratory exercises. In these labs, you will ask questions, make predictions, analyze and interpret data, construct explanations, use computational models, and obtain, evaluate, and communicate information. Students will gain knowledge and practice in the areas of the "student learning goals" for science labs required for UB General Education.

STUDENT LEARNING GOALS (SLGs)

This is an introductory science lab, and as such it is set up to cultivate knowledge and skills that are common in many sciences, which are captured through the Student Learning Goals (SLGs) below. Throughout the semester, we will reference these SLGs within the lab materials to help students track their own progress in mastering these SLGs. These are the key areas of thinking skills that we hope students will carry with them beyond this course.

Student Learning Goal	Exercised in these Labs/Activities:
1. Understand and employ the scientific method .	Phenology, Nature of Science, Fake News, Natural Selection, Anomalies, Hurricanes
2. Distinguish scientific information from pseudo-scientific information, evaluate the role of pseudo-science on public opinion, and assess the effect of society (or historical pressures) on discovery .	Fake News, Love Canal
3. Question specific interpretations of data and debate current scientific controversies .	Anomalies, Hurricanes
4. Analyze how the understanding of scientific phenomena has changed through time , demonstrate that science is a continuous process and identify different factors that may contribute to scientific discoveries while recognizing a path of a scientific discovery (or a set of discoveries) through history.	Nature of Science, Fake News, Love Canal, Hurricanes
5. Examine the role science plays in everyday life .	Fake News, Love Canal, Global Food Systems
6. Identify key ethical issues in scientific research.	Love Canal, Global Food Systems
7. Demonstrate detailed knowledge of the natural sciences at each of the following three scales : (a) micro, (b) human, and (c) global.	Phenology, Anomalies, Global Food Systems
8. Utilize the ePortfolio to compile work that demonstrates this learning.	Final Reflection

Note: The eight SLI Learning Outcomes in the above table meet various UB General Education (UBGE); SUNY categories required by the SUNY General Education Program (http://system.suny.edu/media/suny/content-assets/documents/academic-affairs/general-education/GenedCourseGuidelines_20120530.pdf), and also meet Middle States Commission on Higher Education (MSCHE) categories of general education required by the (MSCHE). UBGE, SUNY UBGE, SUNY Natural Sciences, MSCHE Scientific & Quantitative Reasoning requirements are each met by all of the SLI Learning Outcomes 1 to 8. The MSCHE Ethics requirement is met by SLI Learning Outcome 5.

GRADING POLICY

Your final grade will be a weighted combination of participation, lab assignments, and other elements as follows:

Assessment	Contribution to final grade
Lab Comprehension	55%
Lab Analytic	25%
Participation	10%
Phenology Observations	5%
Final Reflection	5%

Incompletes (I/IU)*: At the professor's discretion, a grade of "Incomplete" can be given for the course if (1) the student has submitted satisfactory work to date, and (2) there are extremely well documented extenuating circumstances for not being able to complete the course. If a grade of "Incomplete" is given, the student will be expected to attend and complete the course the next academic year. Additional information can be found at: <http://undergrad-catalog.buffalo.edu/policies/grading/explanation.shtml>.

Tokens:

- You will have **3 tokens** for the semester (with opportunities to earn more). These tokens will be virtual and may be used for:
 - A **redo** on a lab assignment (a **redo** is only for an assignment that has been **submitted and graded**. You cannot "redo" an assignment that was never done in the first place!)
 - You are only allowed **one redo** on any given assignment.
 - There will be a **hard deadline of Friday, April 10** for all redos from **Fake News through Disasters**. After this date, **NO REDOS WILL BE ACCEPTED** from these labs. There will be a **second hard deadline** for all redos on the remaining labs of **Friday, May 8**.
 - Turning in a comprehension or analytic assignment past its deadline. If you use a token to submit an assignment late, you still need to use a second token if you wish to redo it after it has been graded (but keep in mind the deadlines for redos!).
- **Up to 4 extra tokens** may be earned for:
 - Completing extra seminar reports or other approved activities (see description below) - students may do this up to 4 times.
 - A very exceptional response to an essay question on a lab assignment (at the discretion of the TA). In other words, above and beyond the requirements.
- Tokens can't be traded between students. Each TA will keep a virtual record of the number of tokens used and earned for each student.
- **To use a token:** Students must **EMAIL** their TA when they want to use one of their tokens, and the TA will note it in the record.

COURSE REQUIREMENTS

This course includes both in-class and online learning activities. Access to *UBlearns* is required for this course as on-line readings, videos, and other resources will be assigned. The lab will often meet in the Geographic Information and Analysis Lab (GIAL, www.buffalo.edu/cas/geography/research/research_facilities/geography-gial.html). Class meeting locations are noted in the schedule below. There is no textbook; all necessary materials will be provided to you in lab or via *UBlearns*. Some labs have a 'hands-on' or group work component, while others can be completed on your own.

Lab Comprehension

Most labs will include a 'comprehension' assignment with multiple choice, numerical responses, graphical responses, or short answer responses to questions and prompts. These are automatically graded by *UBlearns* and your score will be available to you immediately after submission. You can then edit and **resubmit the assignment up to three times**

BEFORE the deadline without having to use a token, to improve your grade. Any resubmits **AFTER** the deadline will require the use of a token.

Lab Analytic


Some lab assignments have a second component called the “Lab Analytic,” which consists either of longer questions in UBLearn or a document you will write/prepare and upload as a word file (.doc, .docx, or pdf) to UBLearn. Each analytic will have a set of criteria and associated rubric that will be used for grading.

While you may work together in or outside of class, **your lab analytic must be in your own words and you must create all of your own diagrams/images**. For example, diagrams/images that have been copied from someone else with only minor modifications are not considered your own work, and will be treated as **plagiarism**. In addition, your answers to the lab questions must be given in **complete sentences that use correct spelling and proper grammar**. UBLearn will automatically compare the text of your submissions to all other student submissions (including from past semesters) and flag them for review. **Plagiarism** in this course will result in one or more of the following consequences: failure of the assignment, failure of the course, and/or disciplinary action by the University. *Don't risk your grade, do your own work!* See more information about plagiarism in the Academic Integrity section below.

If you are not satisfied with your grade on the analytic component, **you may use a token to resubmit** a revised version to attempt to improve your grade as mentioned above. This **revised version must be submitted with all changes made in “Track Changes” mode** of Microsoft Word which highlights all changes you made. If your assignment is submitted without all changes highlighted, it will not be regraded. This is necessary to highlight what changes have been made to address the comments of the instructor.

Deadlines:

Each lab assignment will be due the week after the lab class, **by Friday at 5:00pm**. For example, if you have lab on Wednesday, the lab assignment will be due the following Friday (9 days later). Assignments must be turned in on time, or a token may be used **up to one week** after the due date to still get credit. **After one week late, lab submissions can be accepted with the use of a token, but no redos will be allowed after it is graded**. The due dates for all lab activities are specified in UBLearn. **It is your responsibility to check UBLearn and turn in your assignments before they are due**. In most cases, you will be able to finish the lab assignment during the lab scheduled class time. Thus, the lab assignment deadlines (≥ 1 week) are generous and designed to account for unforeseen events like family emergencies and short illnesses.

It is **also your responsibility to ensure that your assignment was successfully submitted** before the deadline. A **small blue clock symbol**  next to your grade for the lab **means that you have NOT submitted it yet** (you must press "submit," not just "save"). A **small yellow circle** with an exclamation mark means that it has been submitted and awaits grading by your TA. You are encouraged to submit the assignment well in advance (e.g. at least 30 minutes) to ensure that you will be able to finish the submission prior to the deadline and prevent errors due to an unreliable internet connection or other technical problems. If you do not finish the lab during the scheduled lab session, you will need access to a computer and reliable internet to complete and submit the weekly lab assignments. Please submit the “Analytic” assignments only once. You will be allowed **three submits BEFORE the deadline** to account for technical problems, but **only the most recent submitted ‘attempt’ will be graded**. Please ensure that the final submission contains the complete assignment. Your TA will have access to all of the submissions but will only look at the most recent one submitted before the due date. If you do not have your own computer, there are several computer labs available around campus that you can use to complete the assignments (see www.buffalo.edu/ubit/service-guides/computing-sites.html). **Lack of access to a computer or the internet is not an acceptable excuse for not completing an assignment, please plan accordingly**. If you have concerns about this, please discuss them with your TA as soon as possible.

Phenology Observations

You will be assigned four trees around Wilkeson Quad to observe throughout the semester. You will enter your observations into the National Phenology Network citizen science project **once per week**. Your grade on this component of the course will be based on the total number of observations made throughout the semester. You will make these observations for **4 weeks** * 4 trees per week = **16** observations. Your grade for this is the proportion of **valid, quality** observations (e.g. the number of observations you made divided by the total number of possible observations). For example, if you make only **12** observations, you will receive a **12/16** = 75% on this assignment. A valid observation is one in which you made your best effort to make an accurate and specific observation and submit it in a timely fashion. If you 'fake' data by not directly observing your trees (and make up or simply copy data from another student), do not enter your data in a timely fashion (e.g. wait until the end of the semester), or otherwise do not follow the spirit of the assignment, your grade will be reduced by the suitable proportion of 'invalid' observations. For example, if you submitted **16** observations but it becomes clear that you stopped observing the tree halfway through the semester, your grade on this component will be 50%. Your **observations should be submitted to Nature's Notebook by midnight on Sunday evenings**. For more reliable observations, please collect the data during daylight hours and around the same day and time each week (for example, try not to collect the data on Sunday one week and then the next day on Monday for the next week). We suggest you get into the habit of completing the observations on your lab day either before or after class. You can use either paper forms provided by the website or the mobile app to record your observations.

Final Reflection

At the end of the semester you will submit a ~250 word 'reflection' on one or more concepts presented/discussed in this course. This will include 1-3 figures (graph, map, etc.) presented in one of the labs (or a related figure from a reputable source). More details are available in UBLearns. If you are completing this course as part of your UB Curriculum requirements, please upload your reflection to your UBPortfolio (powered by Digication) account. Templates have been created for this purpose. You can also upload other artifacts including your lab reports. Your final UB Curriculum requirement, UBC 399: UB Curriculum Capstone, will require you to submit these 'artifacts' as you process and reflect on your achievement and growth through the UB Curriculum. For more information, see the UB Curriculum Capstone website: www.buffalo.edu/ubcurriculum/capstone.html. Please know that the UB Curriculum office provides UBPortfolio support to students during the fall and spring semesters, Monday- Friday in 17 Norton Hall. For hours, visit buffalo.digication.com/ub_portfolio/ubportfolio-walk-in-lab-hours

Participation

This is a lab course; as such **you are expected to attend the lab sessions and participate in activities** and discussion. Most lab sessions will include a short presentation and/or activity that is helpful to understand and complete the lab assignment. To get full credit for attending a lab session, you need to 1) arrive before the presentation begins and 2) stay until you finish the lab or the end of the class session (whichever comes first). A '**late arrival**' is one in which you enter the room after the TA has begun the introductory presentation and an '**early departure**' is one in which you leave before the end of the class period unless you have completed the lab. Either scenario will reduce your attendance score for that day by 50%. If you do not show up at all, you will receive a 0% for that day. Every day, there will be a **sign-in sheet** to record your attendance. **You are responsible for making sure that you sign the sign-in sheet**. Without a signature to record your attendance, points for attending that lab session cannot be guaranteed.

If you miss the presentation at the beginning of the lab session for an unexcused reason, or if you miss the lab entirely for an **unexcused** reason, the **TA is under no obligation to repeat the material or share any data collected during the lab activity**. Be aware that **attendance is necessary in order to complete lab** questions about data generated during the class time. If you miss a lab, the **lab assignment is still due on the original deadline**. You will need to contact a classmate to obtain any missing information.

The University at Buffalo's class attendance policy (undergrad-catalog.buffalo.edu/policies/course/attendance.html) is as follows:

Students may be justifiably absent from classes due to religious observances, illness documented by a physician or other appropriate health care professional, conflicts with university-sanctioned activities documented by an

appropriate university administrator, public emergencies, and documented personal or family emergencies. The student is responsible for notifying the instructor in writing with as much advance notice as possible.

If a student does not attend a lab session they will be counted as absent (as described above) unless they meet both of the following criteria:

1. The student provides a note from an appropriate authority, as outlined at <http://undergrad-catalog.buffalo.edu/policies/course/attendance.shtml>
2. The student **contacts the TA BEFORE the start of the lab session**, unless the note explains why the TA could not be contacted.

You must attend the lab section for which you are enrolled. Under extenuating circumstances, and with **advance** permission of *both* TAs, you might be permitted to switch labs for one week. You must still hand in your lab materials by the original deadline. *The acceptance of your excuse is at the discretion of your TA.*

See the University website for cancellations/delays due to weather or other unforeseen events (<http://emergency.buffalo.edu/campus-weather-alerts.html>).

Seminar Reports

You can earn **extra tokens** by attending public seminars related to lab topics throughout the semester. A list of seminar series at UB related to course topics will be posted to UBlearns and updated throughout the semester. If you know of a related event on campus that is not listed, please contact your TA and they *may* add it to the list of eligible events. To receive credit for attending a seminar, you must submit a 150-250 word summary to *UBlearns* - the requirements for the summary are described in the Seminar Reports section of UBlearns. An example seminar report and the grading rubric is available in *UBlearns*. If you are unable to attend ANY seminars due to scheduling conflicts, please see your TA.

Communicating with your TA

email: For personal questions that are not relevant to your classmates, you can email the TA. We will try to reply within 48 hours on work days (Monday - Friday from 8-5). Do not expect a reply to emails on the weekend. You will typically receive a reply much sooner, but please plan accordingly. For example, if you send a last-minute question about a lab on the afternoon it is due, don't expect it to be answered before the deadline.

Office Hours: See *UBlearns* for your TA's contact information and office hours.

ACADEMIC INTEGRITY

Academic integrity is a fundamental university value. Through the honest completion of academic work, students sustain the integrity of the university while facilitating the university's imperative for the transmission of knowledge and culture based upon the generation of new and innovative ideas. Examples of academic dishonesty include: submitting work from another course, plagiarism, cheating, falsification, misrepresentation, and usage of confidential documents. If a student is suspected of academic dishonesty, then a three-step consultative resolution will be employed. First, the instructor will notify the student of the incident and arrange a meeting. Second, the instructor will orally inform the student of the sanction, which could include: **warning, revision, reduction in grade, or failure of course**. Third, the instructor will provide the student with a written copy of the decision. See the university Undergraduate policy for more information at academicintegrity.buffalo.edu/policies.php.

Classroom Decorum

UB has a strong set of policies about student actions that disrupt the classroom and about the consequences for this: <http://undergrad-catalog.buffalo.edu/policies/course/obstruction.shtml>. Since distracting behavior has negative effects, this class has the following behavioral requirements:

1. No talking during the presentation
2. No eating during the presentation or in the computer lab
3. No use of cell phones, laptops or other electronic devices except to complete lab exercises.

There is a three-step set of consequences to ignoring these behavioral expectations:

1. The professor will warn you that you are being disruptive, and they will take your name and/or picture.
2. If you are disruptive again in any of the remaining lectures you will be required to leave the lecture.

3. If you are repeatedly disruptive then, subject to Student Conduct Regulations and due process hearings, you will be dismissed from the course for the remainder of the semester.

Plagiarism

Plagiarism, broadly defined, is representing the work of someone else as your own work. Examples of plagiarism include (but are not limited to):

- i) not doing your own calculations (evident as a mistake common to the labs handed in by you and your friends, which is a mistake not found in the labs of other students),
- ii) not making your own diagrams (evident as a diagram which is similar to that of your friend, and dissimilar to those of other students),
- iii) not creating your own written answers (evident as **a discussion which includes the same ideas or words as your friend**, which are not the same as the ideas presented by other students),
- iv) providing answers using values and questions that were given in previous years of the course, and
- v) **providing your answers to someone else.**

Plagiarism becomes a problem when you work too closely with another student in the lab. You may consult with other students, but all calculations, diagrams and written answers **must be done on your own**. If you do calculations and create diagrams and answers with your friends, then you may mistakenly create a set of answers that are indistinguishable from plagiarism. If the answers appear to be plagiarized, then we will conclude that they are plagiarized. To remove this risk, do your own work by yourself.

ACCESSIBILITY RESOURCES

If you have any disability which requires reasonable accommodations to enable you to participate in this course, please contact the Office of Accessibility Resources, 25 Capen Hall, 645-2608, and also the instructor of this course. The office will provide you with information and review appropriate arrangements for reasonable accommodations (<http://www.student-affairs.buffalo.edu/ods/>)

University Support Services

If you need help with the written components of the lab assignments, you are encouraged to contact the Center for Excellence in Writing (<http://www.buffalo.edu/cas/writing.html>).

Critical Campus Resources

Sexual Violence - UB is committed to providing a safe learning environment free of all forms of discrimination and sexual harassment, including sexual assault, domestic and dating violence and stalking. If you have experienced gender-based violence (intimate partner violence, attempted or completed sexual assault, harassment, coercion, stalking, etc.), UB has resources to help. This includes academic accommodations, health and counseling services, housing accommodations, helping with legal protective orders, and assistance with reporting the incident to police or other UB officials if you so choose. Please contact UB's Title IX Coordinator at 716-645-2266 for more information. For confidential assistance, you may also contact a Crisis Services Campus Advocate at 716-796-4399.

Mental Health - As a student you may experience a range of issues that can cause barriers to learning or reduce your ability to participate in daily activities. These might include strained relationships, anxiety, high levels of stress, alcohol/drug problems, feeling down, health concerns, or unwanted sexual experiences. Counseling, Health Services, and Health Promotion are here to help with these or other issues you may experience. You can learn more about these programs and services by contacting Counseling Services: 120 Richmond Quad (North Campus), 716-645-2720; or Health Promotion at 114 Student Union (North Campus), 716-645-2837.

COURSE ORGANIZATION / SCHEDULE

The course schedule is available in UBlerns. The schedule may change during the semester due to unforeseen circumstances. If it does, then the information will be updated via UBlerns. It is **your responsibility** to check the due dates of assignments in UBlerns or enable notifications to receive these announcements.

Class #	Week beginning	Topic	Location	Due Dates
1	1/27	Lab introduction & syllabus overview	Wilk 135	
2	2/3	Fake News <i>What is real?</i>	GIAL	Complete syllabus quiz before class
3	2/10	Nature of Science <i>Evidence-based Thinking</i>	Wilk 135	2/14 - Fake News Comprehension
4	2/17	Phenology 1 <i>How do plants respond to their environment?</i>	GIAL	2/21 - Nature Science Comp & Analytic
5	2/24	Anomalies, Trends, and Temperature: <i>Is It Weather or Is It Climate?</i>	Wilk 135	2/28 - Phenology 1 Comp & Analytic
6	3/2	Natural Disasters: <i>Is Climate Change Worsening Natural Disasters?</i>	Wilk 135	3/6 - Anomalies Comp & Analytic
7	3/9	The Hydrologic Cycle and Freshwater Resources: <i>Why is the Ogallala Aquifer going dry?</i>	GIAL	3/13 - Disasters Comp & Analytic
8	3/16	(Spring Recess - No Labs)		
9	3/23	Global Food Systems: <i>Can We Feed the Growing Population?</i>	Online	3/27 - Ogallala Comp & Analytic 3/27 - Extension - Disasters Comp & Analytic
10	3/30	Zika and COVID-19 <i>Thinking through public health landscapes</i>	Online	4/3 - Food Systems Comp
11	4/6	Love Canal <i>Hazardous waste and environmental justice</i>	Online	4/10 - Zika Comp 4/10 - ALL REDOS Fake News through Disasters
12	4/13	Ozone <i>What caused the ozone hole? How do we know?</i>	Online	4/17 - Love Canal Comp & Analytic
13	4/20	Pika <i>How can global change affect species' survival?</i>	Online	4/24 - Ozone Comp
14	4/27	Climate Wedges and Energy <i>Mitigating and adapting to a changing world</i>	Online	5/1 - Pika Comp & Analytic
15	5/4	Work on Final Reflection and Redos	Online	5/8 - Climate Wedges Comp 5/8 - Final Reflection 5/8 - ALL REDOS DUE 5/8 - Phenology Observations due
16	5/11	(finals week)	Online	