

**GEOL 465L Field Geology
Maymester Spring 2023 Syllabus
(REVISED Jan 2023)**

***The Yukon River Basin:
hydrology, watershed biogeochemistry, and environmental change in the Arctic***

Instructor

Prof. A. Joshua West, ph. x06736, email joshwest@usc.edu, mail to ZHS 117, office ZHS 325B
Office hours during semester (ZHS 325B or Zoom): Wed. 2-4 pm, or by arrangement
Availability during the field course will be variable
TA: To be determined

Details

Units: 4

Class Location:

Part 1 – Orientation meetings on campus

Part 2 – Field course, Yukon River Basin, Canada and Alaska

Class meeting time for Part 1: To be determined

Readings

Readings will be drawn from academic literature as detailed below.

Course Description

This course will introduce students to fieldwork in the Earth and Environmental Sciences. Students will be given training and hands-on experience with specific skills and techniques used in field research, as well as being introduced to the process of scientific research. These activities will take place within the context of the Yukon River Basin in Canada and Alaska, where the pace of environmental change is some of the fastest in the world today, posing a wide range of challenges.

The class will include (1) a survey of the environmental issues around Arctic environmental change, with a particular focus on the Yukon Basin; (2) gaining hands-on experience in field techniques in the Earth and Environmental Sciences (more detail below); and (3) learning about and actively engaging in the process of scientific research. For those interested, there may be possibilities to continue related research after the course, working with samples collected.

Learning objectives

In this class, students will:

- Implement field techniques used in modern research in the Earth and Environmental Sciences, including those described below
- Investigate fundamental questions in watershed hydrology and biogeochemistry, including through active research
- Design research projects based on material covered during the class
- Discuss challenges associated with the rapid pace of environmental change in the Arctic, including permafrost thaw in a warming climate, continued expansion of resource extraction (oil drilling and mining), the salmon crisis of the Yukon, and conservation of the river headwaters.

Enrollment requirements

Prerequisite(s): None – but enthusiasm for a field course in remote environments, with occasionally physically taxing days, is important

Co-requisite(s): None

Concurrent Enrollment: None

Recommended Preparation: College-level Biology and Chemistry, or AP equivalent; and an introductory Earth Sciences or Environmental Studies course (e.g., GEOL 105 or 160)

Priority for enrollment will be given to students in Earth Sciences, followed by Environmental Studies. If places are not filled, the course will be opened to students in other degree programs with priority on those with recommended preparation (see above).

If you have any questions about enrolling in this class, please contact the instructor!

Grading Structure

Participation in pre-field discussions/seminars	10%
Pre-trip reflection	10%
Field exercises (to be completed during the course; 5 total, 10% each)	50%
End-of-class research proposal (described below)	30%

Grading Scale — A: 93-100%, A-: 90-92%, B+: 87-89%, B: 83-86%, B-: 80-82%, C+: 77-79%, C: 73-76%, C-: 70-72%, D: 60-70%, F: <60%

Late/Makeup Policy — If you anticipate not being able to submit work on time, please alert Prof. West as soon as possible. Assignments will be penalized 5% per week that they are late, up to 50%.

Pre-field Orientation Meetings

The first part of the course will involve a series of pre-trip orientation meetings. One purpose of these meetings will be to provide you with an orientation to the field sites and logistics of the class, including arrangements for insurance, field safety, etc. (including wildlife awareness training). Another purpose will be to provide you background on the region and the context for the topics we will be covering during the class. The focus will be on discussion to familiarize you with key concepts and to address questions. Topics and provisional readings will be distributed early in the semester.

Two weeks prior to departure, you will be tasked with writing a reflection (2-3 pages) based on the reading and discussions. This reflection will help to guide thinking and discussion about specific research activities in the field.

Field Class Logistics

The field portion of this class will involve two main components summarized below. Professor West will lead the instruction, aided by two USC PhD students from his research group.

Part 1 of the field class will start in Whitehorse, in the Yukon Territory of Canada, and from there proceed by car from the headwaters of the Yukon River to Fairbanks, Alaska. Accommodation will be a mix of hotels and camping.

Part 2 of the field class will be based in the Fairbanks area and will focus on research in watershed hydrology and biogeochemistry at long-term ecological observatory site. Accommodation will be in shared rooms.

To ensure safety during field activities, students will always work in a group together with an instructor, and Professor West will have a satellite phone at all times for emergencies.

Students will need to be in good health and ideally able to walk in the field for distances up to 2-3 miles. *Please contact Prof. West if you have any concerns about whether you are physically capable of meeting the demands of this course; if you would like to take part in the class, alternative arrangements may be possible (we will work to accommodate all).*

COVID-19

Policies related to COVID-19 will be guided by USC policies during the Spring 2023 semester and at the time of the field activities.

Housekeeping

Behavioral expectations and dismissal from the program

We will be living and working together essentially 24 hours a day, 7 days a week during the field portion of this class. Days in the field can be long and tiring, and the environment may push you outside of your comfort zone. It is essential that all program participants maintain the highest standard of behavior – respectful to each other, our surroundings, and our hosts. Any disrespectful behavior will not be tolerated. You will be warned for the first instance of such behavior. A second instance will lead to your dismissal from the class. In such an instance, you will be responsible for the costs of all transportation home.

Any instance of discrimination or harassment, or other Student Misconduct as defined by USC Policy, will lead to immediate dismissal from the program and reporting to the USC Title IX Coordinator. As above, all costs associated with dismissal will be your responsibility.

Course costs and refund policy

Information about costs for participation in this class will be provided via the USC Study Abroad program. In addition, you may be able to apply for SURF funding in association with this class. Deadlines are early in the Spring semester; please approach Prof. West early to discuss a proposal.

You will be expected to be available for in Whitehorse, Canada, by the end of the day on Monday, May 15th. For those who would like to travel as a group from Los Angeles, we will coordinate travel plans during pre-trip orientation meetings. We are scheduled to be finished with the class in Fairbanks, Alaska at the end of the day on Friday, June 2nd. Again group travel returning to Los Angeles can be coordinated for June 3rd.

You will be responsible for providing your own personal equipment, including for camping. We have a limited amount of equipment we can loan if you are not able to provide your own.

Medical/compassionate withdrawal policy

Withdrawal will be permitted only in unanticipated circumstances that are beyond your control. You will need to offer appropriate justification, with documentation. As a requirement of the Maymester program, you will be required to pay a \$500 deposit on registration which will automatically be assessed to your USC account. This deposit will be re-credited to your account on completion of the class. If you withdraw from the class without documentation, you will forfeit the deposit. Please be aware that there are limited places available for students in this class, so if you sign up and then withdraw, you will be preventing someone else from taking part. We expect students to only withdraw under absolutely unavoidable circumstances.

Also, once we leave Los Angeles, during much of the class duration we will be in remote locations where it will be challenging to return home separately. If you do need to leave during the class, you will be responsible for covering the costs of necessary transportation. We will have travel insurance (International SOS, through USC) that will help in the case of an emergency. You will receive more details of this insurance during orientation meetings.

Research proposals

As a “final summative experience” for this course, you will be responsible for submitting (via email) a research proposal building on themes related to this course. This proposal should pick up on a major research problem that we have considered either in our pre-field seminars or during the field trip itself (or both), and should design a research experiment that would tackle this problem. This is an opportunity to consider “what would you do” within the scope of the problems we have discussed in the class.

The proposal should follow the format of a scientific research proposal. You will be provided a template during the class. Total length should be 5-8 pages, single spaced and including figures but not references. A typical proposal should contain at least 15 references, and often many more.

The proposal will be due on June 15th, approximately two weeks after the end of the field portion of the trip, to allow for submitting final grades within the Maymester grading deadline. Prof. West and the TA will be available for discussion about proposal ideas and specifics both during the course and after, either in office hours or via email.

What are some specific field skills that you can hope to be exposed to?

- Measurement of water flow in streams and rivers
- Chemical analysis of stream waters and groundwaters
- Measurement, analysis, and interpretation of atmospheric CO₂, and of ecosystem C fluxes
- Surveying and Geographic Information System (GIS) analysis
- Application of remote sensing to hydrological, biogeochemical and ecosystem problems

Statement on Academic Conduct and Support Systems

- Please advise Prof. West as early as possible if you need any accommodation related to this class, so that there is adequate time to make necessary preparations.
- In case of a declared emergency during the portion of this class held on campus, we will seek to teach this class to the best extent possible using electronic communication. Relevant announcements will be made by USC executive leadership and/or the course instructor.
- Emergency procedures for the portion of this class held off campus will be discussed during the pre-trip class meetings, and detailed information will be provided at that time.

Academic Integrity

The University of Southern California is foremost a learning community committed to fostering successful scholars and researchers dedicated to the pursuit of knowledge and the transmission of ideas. Academic misconduct is in contrast to the university’s mission to educate students through a broad array of first-rank academic, professional, and extracurricular programs and includes any act of dishonesty in the submission of academic work (either in draft or final form).

This course will follow the expectations for academic integrity as stated in the USC Student Handbook. All students are expected to submit assignments that are original work and prepared

specifically for the course/section in this academic term. You may not submit work written by others or “recycle” work prepared for other courses without obtaining written permission from the instructor(s). Students suspected of engaging in academic misconduct will be reported to the Office of Academic Integrity.

Other violations of academic misconduct include, but are not limited to, cheating, plagiarism, fabrication (e.g., falsifying data), knowingly assisting others in acts of academic dishonesty, and any act that gains or is intended to gain an unfair academic advantage. Please ask us if you are unsure about what constitutes unauthorized assistance on an exam or assignment, or what information requires citation and/or attribution.

The impact of academic dishonesty is far-reaching and is considered a serious offense against the university and could result in outcomes such as failure on the assignment, failure in the course, suspension, or even expulsion from the university.

For more information about academic integrity see the student handbook or the Office of Academic Integrity’s website, and university policies on Research and Scholarship Misconduct.

If found responsible for an academic violation, students may be assigned university outcomes, such as suspension or expulsion from the university, and grade penalties, such as an “F” grade on the assignment, exam, and/or in the course.

Course Content Distribution

Distribution or use of notes, recordings, exams, or other intellectual property, based on university classes or lectures without the express permission of the instructor for purposes other than individual or group study. This includes but is not limited to providing materials for distribution by services publishing course materials. This restriction on unauthorized use also applies to all information, which had been distributed to students or in any way had been displayed for use in relationship to the class, whether obtained in class, via email, on the internet, or via any other media. (Living our Unifying Values: The USC Student Handbook, page 13).

Student Support Systems

Counseling and Mental Health - (213) 740-9355 – 24/7 on call

Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

988 Suicide and Crisis Lifeline - 988 for both calls and text messages – 24/7 on call

The 988 Suicide and Crisis Lifeline (formerly known as the National Suicide Prevention Lifeline) provides free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week, across the United States. The Lifeline is comprised of a national network of over 200 local crisis centers, combining custom local care and resources with national standards and best practices. The new, shorter phone number makes it easier for people to remember and access mental health crisis services (though the previous 1 (800) 273-8255 number will continue to function indefinitely) and represents a continued commitment to those in crisis.

Relationship and Sexual Violence Prevention Services (RSVP) - (213) 740-9355(WELL) – 24/7 on call. Free and confidential therapy services, workshops, and training for situations

related to gender- and power-based harm (including sexual assault, intimate partner violence, and stalking).

Office for Equity, Equal Opportunity, and Title IX (EEO-TIX) - (213) 740-5086

Information about how to get help or help someone affected by harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants.

Reporting Incidents of Bias or Harassment - (213) 740-5086 or (213) 821-8298

Avenue to report incidents of bias, hate crimes, and microaggressions to the Office for Equity, Equal Opportunity, and Title for appropriate investigation, supportive measures, and response.

The Office of Student Accessibility Services (OSAS) - (213) 740-0776

OSAS ensures equal access for students with disabilities through providing academic accommodations and auxiliary aids in accordance with federal laws and university policy.

USC Campus Support and Intervention - (213) 740-0411

Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

Diversity, Equity and Inclusion - (213) 740-2101

Information on events, programs and training, the Provost's Diversity and Inclusion Council, Diversity Liaisons for each academic school, chronology, participation, and various resources for students.

USC Emergency - UPC: (213) 740-4321, HSC: (323) 442-1000 – 24/7 on call

Emergency assistance and avenue to report a crime. Latest updates regarding safety, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible.

USC Department of Public Safety - UPC: (213) 740-6000, HSC: (323) 442-1200 – 24/7 on call

Non-emergency assistance or information.

Office of the Ombuds - (213) 821-9556 (UPC) / (323-442-0382 (HSC)

A safe and confidential place to share your USC-related issues with a University Ombuds who will work with you to explore options or paths to manage your concern.

Occupational Therapy Faculty Practice - (323) 442-2850 or otfp@med.usc.edu

Confidential Lifestyle Redesign services for USC students to support health promoting habits and routines that enhance quality of life and academic performance.

Provisional field schedule and assignment due dates
(subject to modification/adjustment)

Day	Date	What/where	Overnight	Assignment Due
Pre-trip	May 1			Pre-trip reflection
Day 1	May 15	Arrive Whitehorse, YT	Takhini Hot Springs	
Day 2	May 16	Day trip to Kluane, return to Takhini	Takhini Hot Springs	
Day 3	May 17	Whitehorse to Moose Creek Lodge	Moose Creek Lodge	
Day 4	May 18	Moose Ck Lodge to Tombstone Camp	Tombstone Camp	Stream & Hot Spring Alkalinity
Day 5	May 19	Tombstone Camp to Dawson City	Klondike Kate's Cabins	
Day 6	May 20	Dawson City to Chicken AK	Chicken Gold Camp	
Day 7	May 21	Chicken AK to Delta Junction AK	Kelly's AK Country Inn	
Day 8	May 22	Delta Junction AK to Fairbanks	Cabin in the Woods	Sediment Provenance
Day 9	May 23	Army Corps Permafrost Tunnel	Cabin in the Woods	
Day 10	May 24	Fairbanks to Yukon R.	Yukon River Camp	
Day 11	May 25	Yukon R. to Wiseman	Coldfoot Camp	
Day 12	May 26	Wiseman to Toolik	Toolik Field Station	Permafrost Characterization
Day 13	May 27	Toolik Field Station	Toolik Field Station	
Day 14	May 28	Toolik Field Station	Toolik Field Station	
Day 15	May 29	Toolik Field Station	Toolik Field Station	Hydrological Measurement
Day 16	May 30	Toolik Field Station	Toolik Field Station	
Day 17	May 31	Toolik Field Station	Toolik Field Station	
Day 18	June 1	Toolik Field Station	Toolik Field Station	GHG Fluxes
Day 19	June 2	Fairbanks, end of trip/wrapup	Cabin in the Woods	
Post-trip	June 15			Research Proposal