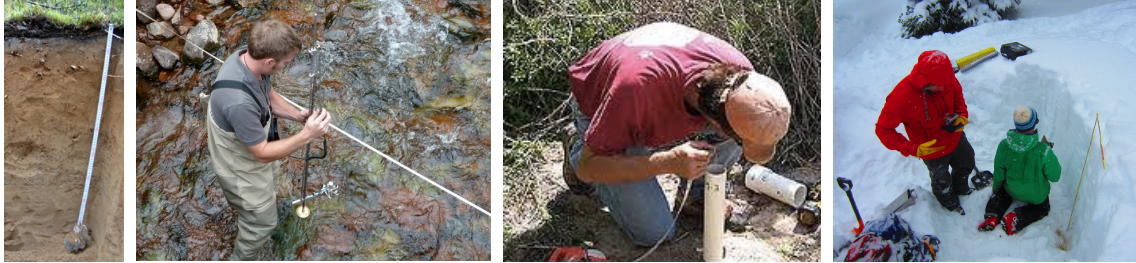


**GEOG 4100**  
**Special Topics in Geography:**  
**Hydrologic Field Methods and Research Design**



**Instructor:** Alice Hill

**Office:** INSTAAR 114 (East Campus)

**Office hours:** By appointment

**Email:** [alice.hill@colorado.edu](mailto:alice.hill@colorado.edu)

**Session:** Summer 2014 (June 3, 2014 – June 20, 2014; this is a “Maymester” course format.)

**Class meeting times:** Monday-Friday, generally 9-5pm. However, some days may start earlier or end later depending on the skill focus and location. Participation in an overnight field campaign is required.

**Location:** Classroom lectures will take place at the CU-Boulder campus. Field sites include Niwot Ridge Mountain Research Station (near Boulder, CO), among others (TBC).

**About the class:** This is an undergraduate course for students who are interested in learning field techniques and field research design relating to water resources used in geography and environmental sciences. The course utilizes field-based learning opportunities to reiterate theory and methodology as well as for gaining hands-on, real-world experience with hydrologic field methods. The course will culminate in a multi-day backcountry field research campaign based around a basic research question and field research plan that is designed by the student team. Data collected will be used for learning basic data processing and analysis processes in pursuit of addressing the research question.

You will gain knowledge and experience with important field-based skills relevant to the hydrologic sciences including:

- Stream flow measurements
- Surface water quality measurements
- Snow pit data collection
- Snow depth surveys
- Snow melt water sampling
- Groundwater sampling and monitoring
- Mapping with Global Positioning System (GPS)
- Field research design considerations
- Science team collaboration, learning and leadership in front, fringe, and back-country environments and research sites
- Remote field risk management, safety and self sufficiency

In addition to field work, the course emphasizes basic mathematical and computational skills necessary to interpret data collected in the field. This course fulfills the departmental “methods” requirement for Geography majors and it satisfies the “application” requirement in Environmental Studies.

**Logistics:** All students in the class will travel to day trip field sites in student vehicles. Students will likely travel in CU vehicles for out-of-county field trips. Students are responsible for arranging their own accommodation in Boulder, Colorado. Students will stay in pre-arranged accommodation (either dorm-like facilities or tent camping) when the course is based outside of the Boulder area.

**Prerequisites:** None, however, a basic background in hydrology before taking this course will be helpful but not imperative.

**Textbook:** Relevant material will be distributed in class and posted on the course web site.

**Grading:** Your course grade will be determined as follows:

Demonstration of Competence of Field Techniques	50%
Problem Sets	10%
Team Research Results Report	5%
Team and Peer Leadership and Participation	5%
Midterm Exam (May 20)	10%
Final Exam (May 30)	20%

The exams will cover material from classroom lectures and field techniques. Test questions will be short answer with some calculations.

**Attendance Policy:** Because of hands-on skill building nature of the course, attendance to 100% of lectures and field trips is mandatory. Not showing up for a day without a pre-arranged solution with the instructor is not an option.

## Course Schedule

\*Schedule is subject to change depending on weather, water/snow conditions, access to wells, etc. Be prepared to remain flexible!\*

Day	Topic (Morning)	Topic (Afternoon)	Location	Assignment
1	Introductions, Course Overview, Setting the Stage: Water Resource Reservoirs, Challenges and Issues	Basic Hydrology, Field Techniques Overview	CU-Boulder	
2	Surface Water: flow gauging methods (Pygmy meter and float method)	Surface Water: Tracer flow method (if possible); water quality analysis; inspect and discuss invasives.	South Boulder Creek	Flow comparison problem set (due day 3)
3	Soils and groundwater primer	Soil profiling; Groundwater measurement and monitoring: piezometers, soil tensiometers	Niwot Ridge	
4	Snow primer	Snow: Lysimeters.	Niwot Ridge	
5	Snow: Snow pit data collection - density, SWE, stratigraphy	Snow: Snow depth measurement methods	Niwot Ridge	SWE problem set (due day 7)
6	Midterm	Field Research Design Considerations, Research question development and plan; rig for expedition	CU-Boulder	
7	Remote field site skill building		TBD (Field)	Individual presentation
8				
9	Backcountry field expedition - data collection relating to research question; GPS, map skills; remote environment risk management, team and peer leadership emphasis			
10				
11	Download/compile data, Statistics primer (or review as needed)	Data Analysis of expedition data relating to research question	CU-Boulder	Statistics problem set (due day 13)
12	Data analysis, continued	Compile findings; team report.	CU-Boulder	Team Report (due day 14)
13	Exam Review	Off (study for exam)	CU-Boulder	
14	Wrap up, evaluations	Final Exam	CU-Boulder	

**Disabilities, Honor Code, Etc:**

If you qualify for accommodations because of a disability, please submit to me a letter from Disability Services in a timely manner so that your needs may be addressed. Disability Services determines accommodations based on documented disabilities.

Contact: 303-492-8671, Willard 322, and <http://www.Colorado.EDU/disabilityservices>

Campus policy regarding religious observances requires that faculty make every effort to reasonably and fairly deal with all students who, because of religious obligations, have conflicts with scheduled exams, assignments or required attendance. See full details at

[http://www.colorado.edu/policies/fac\\_relig.html](http://www.colorado.edu/policies/fac_relig.html)

Students and faculty each have responsibility for maintaining an appropriate learning environment. Those who fail to adhere to such behavioral standards may be subject to discipline. Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with differences of race, culture, religion, politics, sexual orientation, gender, gender variance, and nationalities. Class rosters are provided to the instructor with the student's legal name. I will gladly honor your request to address you by an alternate name or gender pronoun. Please advise me of this preference early in the semester so that I may make appropriate changes to my records. See policies at

<http://www.colorado.edu/policies/classbehavior.html> and at

[http://www.colorado.edu/studentaffairs/judicialaffairs/code.html#student\\_code](http://www.colorado.edu/studentaffairs/judicialaffairs/code.html#student_code)

The University of Colorado at Boulder policy on Discrimination and Harassment, the University of Colorado policy on Sexual Harassment and the University of Colorado policy on Amorous Relationships apply to all students, staff and faculty. Any student, staff or faculty member who believes s/he has been the subject of discrimination or harassment based upon race, color, national origin, sex, age, disability, religion, sexual orientation, or veteran status should contact the Office of Discrimination and Harassment (ODH) at 303-492-2127 or the Office of Judicial Affairs at 303-492- 5550. Information about the ODH, the above referenced policies and the campus resources available to assist individuals regarding discrimination or harassment can be obtained at <http://www.colorado.edu/odh>

All students of the University of Colorado at Boulder are responsible for knowing and adhering to the academic integrity policy of this institution. Violations of this policy may include: cheating, plagiarism, aid of academic dishonesty, fabrication, lying, bribery, and threatening behavior. All incidents of academic misconduct shall be reported to the Honor Code Council ([honor@colorado.edu](mailto:honor@colorado.edu); 303-725-2273). Students who are found to be in violation of the academic integrity policy will be subject to both academic sanctions from the faculty member and non-academic sanctions (including but not limited to university probation, suspension, or expulsion). Other information on the Honor Code can be found at

<http://www.colorado.edu/policies/honor.html>

and at <http://www.colorado.edu/academics/honorcode/>