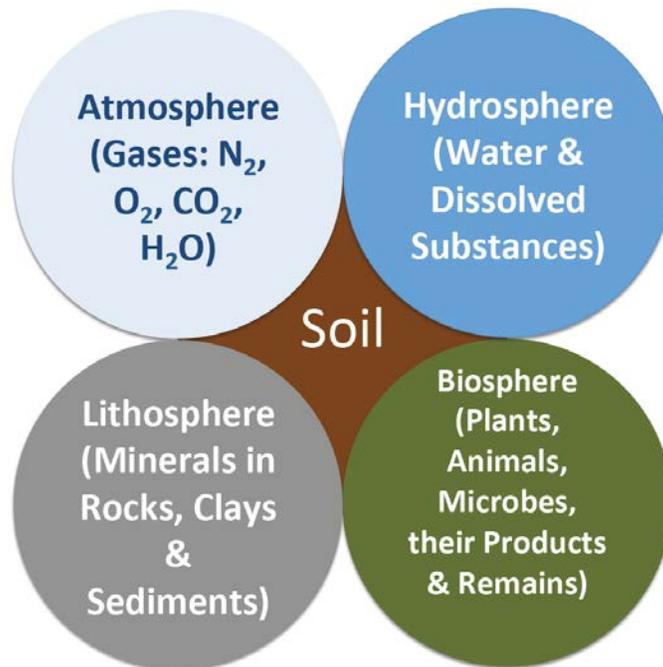


NRSM 210N – Soils, Water & Climate

Course Description

The factors affecting earth's terrestrial ecosystems are rapidly changing, and understanding their capacity to provide important services to humanity is becoming increasingly important. In this course, students will explore how climate, water and soils interact to shape Earth's biosphere. We will introduce students to a number of fundamental concepts in climate, hydrology, and soil science to gain a comprehensive view on factors shaping and affecting all terrestrial ecosystems. Through a series of lectures and field-based laboratories, students will be introduced to the most important bioclimatic variables (temperature and water) that influence soil development, how they vary across spatial scales, how variations in the main drivers of soil development affect water retention and water movement in soils, the dynamics of chemical movement in soils, soil morphology, and the relationships between climate, water, soils, and vegetation on the landscape.



Learning Outcomes

Students will examine properties and processes of Earth's climate and hydrologic systems, and investigate how variations in climate influence both hydrology and soil across the landscape. Over the course of the semester, students will learn a suite of climate, hydrology and soil analysis techniques, and will develop the skills to measure, describe and understand the relationship among climate, hydrology, soils, and vegetation on the landscape. Students will be introduced to atmospheric science, hydrologic science, and soil science through a number of field and lab-based exercises that investigate how these factors interact to form the ecosystems around us. Students will demonstrate learning through a series of exams and practical laboratory reports and projects. At the end of the course students will understand how the climate system operates, and how it influences ecosystem hydrology, soils and vegetation patterns across the landscape. You will greatly benefit from reading your assigned chapters from the lab book and textbook prior to coming to both lecture and lab. Good luck, and enjoy the class.

**NRSM 210 – Soils, Water & Climate
Spring 2020**

Course Details

Instructors:

Name: Dr. Ashley Ballantyne (Part 1)
Office: CHCB 435 (The Science Complex/Charles H. Clapp Building)
Phone: 243-6791
Email: ashley.ballantyne@umontana.edu
Office Hours:

Name: Dr. Kevin Hyde (Part 2)
Office: CHCB 404
Email: Kevin.Hyde@umontana.edu
Office Hours: 12:00 – 1:00 PM, Tuesdays and Thursdays

Name: Dr. Cory Cleveland (Part 3)
Department: Ecosystem & Conservation Sciences
Office: CHCB 423B (The Science Complex)
Phone: 243-6018
Email: Cory.Cleveland@umontana.edu
Office Hours: 10:00 – 10:50 AM, Tuesdays and Thursdays

Lecture location & Time:

CHCB 131, 11:00 AM – 11:50 AM, Tuesdays and Thursdays

Required Text:

– *A Custom Edition for Soils, Water & Climate*. 2013. Pearson Publishing.

This is a custom textbook and is **ONLY** available at the UM bookstore. Previous versions of the Soils Textbook (Brady and Weil) will not be sufficient, and we strongly recommend you purchase this book. There will also be several copies on 2-hour reserve at the library.

Additional Course Materials & Information:

On the [Moodle site](#), you will need to enter your Net ID and password to access the course schedule, lab manual, and material to supplement lectures, including some outside readings. Whenever possible, lecture notes will be posted on the Moodle page before lectures but may be modified post-lecture according to how much was covered in class.

Lab Instructors/TAs:

The course TA's have not yet scheduled regular office hours, but are always happy to meet. To schedule with your lab instructor/TA, please email them directly to request an appointment.

Haley Hodge Haley.Hodge@umontana.edu
Office: CHCB 460

Alanna Shaw Alanna.Shaw@umontana.edu
Office: CHCB 423

Chad Hammer Chad.Hammer@umontana.edu
Office: CHCB 434

Lab location & Time:

Time: 2:10 - 5:00 starting the week of March 9, 2020.

Field labs will depart from the loading dock behind the Science Complex (south side of CHCB Building).

Please be advised that all laboratory exercises start promptly at 2:10 PM.

Lab Book:

The *Climate, Water and Soils Lab Manual* will be available on [Moodle](#) in early March. Please print it out and read it before coming to lab each week. Quizzes prior to each week's lab are fair game.

Course Grading*:

Grades will be computed from the following four components:

- Lab assignments, homework, quizzes, etc. (25%)
- Midterm Exam 1 (25%)
- Midterm Exam 2 (25%)
- Midterm Exam 3 (25%)

* Please note, this class is offered for traditional letter grade only, it is not offered under the credit/no credit option.

WARNING:

There will be NO MAKEUP EXAMS and NO MAKEUP LABS except under extraordinary circumstances. If you absolutely must miss a lab, you should make plans to attend another. **Attendance in lab is not optional.** Students with more than one unexcused absence will not pass the lab, and students who do not pass lab will not pass the course. Finally, students with more than one failing grade on the midterm exams will not pass the course.

Class Attendance Policies

Students who are registered for a course but do not attend the first two class meetings may be required by the instructor to drop the course. This allows for early identification of class vacancies to permit other students to add classes. Students not allowed to remain must complete a drop form or drop the course through [Cyberbear](#) to avoid receiving a failing grade. Students who know they will be absent should contact the instructor in advance.

Students are expected to attend all class meetings and complete all assignments for courses in which they are enrolled. Instructors may excuse brief and occasional absences for reasons of illness, injury, family emergency, religious observance or participation in a University sponsored activity. (University sponsored activities include for example, field trips, ASUM service, music or drama performances, and intercollegiate athletics.) Instructors shall excuse absences for reasons of military service or mandatory public service.

Recommended Preparation

- Successful completion of a university-level chemistry course (e.g., CHMY 121N).
- Come to class and be prepared to participate.
- Before class, read the assigned material and be prepared to answer questions. Quizzes covering the reading are fair game.
- Check web notes a few days following the lecture for changes and review.
- Turn in assignments on time.
- To pass this course, you **MUST** have a passing grade in the lab, so plan accordingly. This means no more than one absence from lab, and passing performance (average) on the laboratory assignments.

Other, Warnings, Caveats, Red Tape, and University Considerations

You are expected to read the assigned material, and will be responsible for its content. We will ask a lot of you in this class, and expect a high level of commitment to the course. A knowledge of soil and the science of soil is integral to understanding a range of critical environmental issues the world now faces, but just like in many areas of science, to deal with those issues, you must first learn the basics of the discipline. And hopefully along the way you have some fun!

Students with Disabilities

The University of Montana assures equal access to instruction through collaboration between students with disabilities, instructors, and Disability Services for Students (DSS). If you think you may have a disability adversely affecting your academic performance, and you have not already registered with DSS, please contact DSS in Lommasson 154 or 406.243.2243. We will work with you and DSS to provide an appropriate modification.

Basic Needs Security Statement

Any student who has difficulty affording groceries or accessing sufficient food to eat every day, or who lacks a safe and stable place to live, and believes this may affect their performance in the course, is urged to contact the [Office of Student Success] for support. Furthermore, please notify the professor if you are comfortable in doing so. This will enable her to provide any resources that she may possess.

Any student who faces challenges securing their food or housing and believes this may affect their performance in the course is urged to contact the [Office of Student Success] for support. Furthermore, please notify the professor if you are comfortable in doing so. This will enable her to provide any resources that she may possess.

Course Withdrawal Deadlines and Drop/Add Policies

Deadline	Description	Date
To 15 th instructional day	Students can drop classes on Cyberbear with refund & no “W” on Transcript, last day to change to Audit	February 3, @5 PM
16 th to 45 th instructional day	A class drop requires a form with instructor and advisor signature, a \$10 fee from registrar’s office, student will receive a ‘W’ on transcript, no refund.	February 4 – March 24 @5 PM
Beginning 46 th instructional day	<u><i>Students are only allowed to drop a class under very limited and unusual circumstances.</i></u> Not doing well in the class, deciding you are concerned about how the class grade might affect your GPA, deciding you did not want to take the class after all, switching majors, and similar reasons are not among those limited and unusual circumstances. If you want to drop the class for these sorts of reasons, make sure you do so by the end of the 45 th instructional day of the semester. Requests to drop must be signed by the instructor, advisor, and Associate Dean (in that order) so if you pursue this request, <i>leave sufficient time to schedule meetings with each of these individuals</i> (generally this will take at least 3-5 working days). A \$10 fee applies if approved. Instructors must indicate whether the individual is Passing or Failing the class at the time of request.	March 25 – May 1 @5 PM

Finally, the usual rules concerning academic honesty apply in this course.

All students must practice academic honesty. Academic misconduct is subject to an academic penalty by the course instructor and/or a disciplinary sanction by the University. All students need to be familiar with the [Student Conduct Code](#). Academic misconduct includes plagiarism. Don’t plagiarize someone else’s work, period.

Lecture Schedule

Date	Class	Topic	Reading (pages)
		Climate	
1/14	1	Introduction/The Earth System	5-24 (B)
1/16	2	The Earth System	5-24 (B)
1/21	3	Atmospheric Composition	35-47 (B)
1/23	4	Atmospheric Structure	47-53 (B)
1/28	5	Solar Radiation	59-72 (B)
1/30	6	Atmospheric Temperature	72-87 (B)
2/4	7	Atmospheric Pressure	95-102 (B)
2/6	8	Atmospheric Circulation	102-123 (B)
2/11	9	Atmospheric Moisture	131-163 (B)
2/13	10	Midterm Exam1	(B)
		Water	
2/18	11	The Hydrosphere/Water Balance	171-196 (H)
2/20	12	Hydrology and Soils	410-459 (H)
2/25	13	Soil Physical Properties	303-352 (H)
2/27	14	Soil Physical Properties	303-352 (H)
3/3	15	Unsaturated Water Flow in Soils	361-403 (H)
3/5	16	Unsaturated Water Flow in Soils	361-403 (H)
3/10	17	Plant-Soil Water Continuum	419-430 (H)
3/12	18	Plant-Soil Water Continuum	419-430 (H)
3/17	19	Spring Break	
3/19	20	Spring Break	
3/24	21	Soil Erosion Processes	Moodle (H)
3/26	22	Midterm Exam 2	(H)
		Soils	
3/31	23	Soil Formation	200-232 (C)
4/2	24	Soil Formation & Classification	232-268 (C)
4/7	25	Soil Classification	268-302 (C)
4/9	26	Soil Classification/Chemistry	
4/14	27	Soil Chemistry	462-509 (C)
4/16	28	Soil Chemistry	514-558 (C)
4/21	29	Soil Ecology	559-612 (C)
4/23	30	Soil Organic Matter	613-660 (C)
4/28	31	Soil Nutrients	662-698; 718-752 (C)

Date	Class	Topic	Reading (pages)
5/30	32	Midterm Exam 3	(C)
5/4 (8 AM – 10 AM)		Final Exam	

*Letters denote lecturers: B = Ballantyne; C = Cleveland; H = Hyde. Page numbers refer to the UM Custom *Soils, Water, and Climate* textbook. Page reading is **DUE** on the days for which they are assigned.