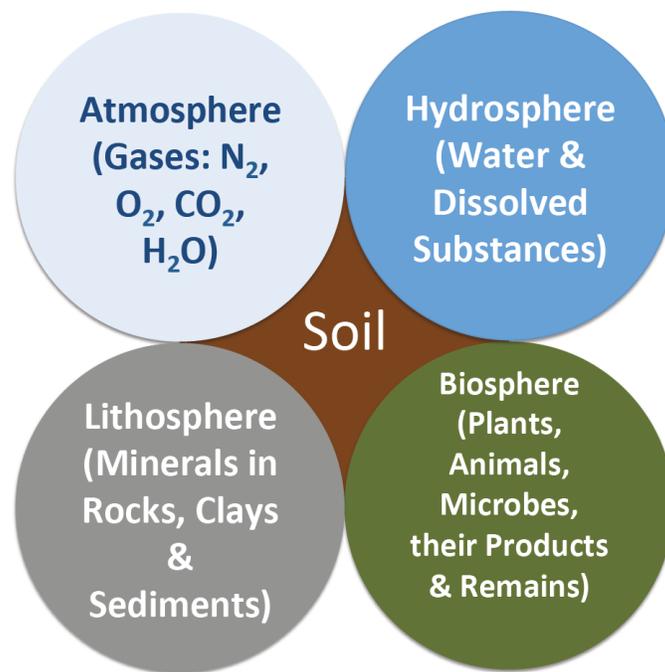


NRSM 210N – Soils, Water & Climate

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 2016**

Course Details

Instructors:

Name: Dr. Ashley Ballantyne
Department: Ecosystem & Conservation Sciences
Office: CHCB 434 (The Science Complex)
Phone: 243-6791
Email: Ashley.Ballantyne@umontana.edu
Office Hours: 10:00 – 11:00 AM, T/R

Name: Dr. Kelsey Jencso
Department: Forest Management
Office: CHCB 423A (The Science Complex)
Phone: 243-6793
Email: Kelsey.Jencso@umontana.edu
Office Hours: 12:10 – 1:00 T/R

Name: Dr. Cory Cleveland
Department: Ecosystem & Conservation Sciences
Office: CHCB 423B (The Science Complex)
Phone: 243-6018
Email: Cory.Cleveland@umontana.edu
Office Hours: 10:00 – 11:00 AM, T/R

Lecture location & Time:

Natural Science 307, 11:10 AM – 12:00 PM T/R

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 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:

TA's do not hold regular office hours. To meet with your lab instructor/TA, please email them directly to schedule an appointment.

Colin Maher Colin.Maher@umontana.edu

Lab location & Time:

Time: 2:10 - 5:00 T and TR (unless otherwise noted)

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* is available on [Moodle](http://umonline.umd.edu/) (<http://umonline.umd.edu/>). 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%)
- Final Exam (25%)

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.

A note on course drop deadlines: If you decide to drop this course, you have the first 15 instructional days of the semester to do so on Cyberbear. **Beginning the sixteenth (16) instructional day of the semester through the forty-fifth (45) instructional day**, you may use paper forms to drop, add and make changes of section, grading option, or credit. However, after 45 days, we will not sign drop forms except under extraordinary circumstances, such as:

1. An accident or illness prevents you from meeting the course requirements
2. You received no evaluation of your performance before the drop deadline
3. A family or personal emergency prevents you from meeting course requirements
4. Your employment schedule changed, preventing you from meeting course requirements

Poor performance in the course is not a valid reason for dropping the course after the 45-day deadline.

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 Lommason 154 or 406.243.2243. I will work with you and DSS to provide an appropriate modification.

Course Withdrawal Deadlines

| Dates | Description | Date Range |
|--|---|------------------------------|
| To 15 th instructional day | Students can drop classes on Cyberbear with refund | February 12 through last day |
| 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 13 through March 28 |
| Beginning 46 th instructional day | Students are only allowed to drop a class under very limited and unusual circumstances. 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, 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 and a \$10 fee applies. | March 29 through May 6 |

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 | |
| 1/26 | 1 | Introduction/The Earth System | 5-27 (B) |
| 1/28 | 2 | The Earth System | 5-24 (B) |

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

| Date | Class | Topic | Reading (pages) |
|------|-------|----------------|----------------------|
| 5/5 | 28 | Soil Nutrients | 662-698; 718-752 (C) |
| 5/10 | 29 | Soil Nutrients | 662-698; 718-752 (C) |
| 5/12 | 30 | Exam 3 | |

*Letters denote lecturers: B = Ballantyne; C = Cleveland; J = Jencso. With the exception of the reading for 11/3 (available on Moodle), all page numbers refer to the UM Custom *Soils, Water, and Climate* textbook. Page reading is **DUE** on the days for which they are assigned.