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NRSM 212N.00: Ecology, Physics and Taxonomy of Soils

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**NRSM 212N – Ecology, Physics and Taxonomy of Soils
Fall 2022**

This course introduces students to the physical, chemical, and biological properties of soils, and on how water moves into and out of soils. Students will assess properties and processes of Earth's soils, differentiate between different soils, and be able to describe the causes and consequences of variations in soils and soil properties and how they influence soil water quantity, quality and land management actions. NRSM 212N is designed to strengthen student's comprehension of concepts and theory presented in the NRSM 211N lecture through a series of "hands on" field and laboratory-based experiments. Over the course of the semester, students are exposed to a suite of soil and water analysis techniques and will be able to describe and understand the relationships among soils, soil water physics, nutrients and vegetation on the landscape based upon experiments and analysis of their results. The laboratory develops students understanding of the scientific method, measurement uncertainty and analytical techniques for soil and ecosystem studies. Students demonstrate comprehension through a series of laboratory quizzes, group discussion, team-oriented data collection and self-guided laboratory assignments.

Learning Outcomes:

Theory and Practice - Students will compare, contrast and predict soil physical, chemical and hydrological properties based on a series of quantitative investigations. Students will apply these principles and the scientific method in the context of forest and grassland ecosystems and demonstrate the ability to solve quantitative, interdisciplinary, real-world problems.

Laboratory Skills and Procedure - Students will be able to design and execute an experimental procedure, work independently, interpret experimental results, and draw a reasonable, accurate conclusion. Students will synthesize concepts in soil and water science using modern methods and instrumental techniques.

Communication and Information Literacy - Students will use computer technology to gather, process, analyze, and present chemical data, and communicate critical analysis of scientific information through written reports, laboratory notebooks and oral presentations.

Readiness for Advanced Coursework - Students will be prepared to take advanced courses in their degree program that require understanding of the scientific method, analytical techniques, measurement uncertainty and ability to synthesize environmental data.

Instructors:

Name: Dr. Kelsey Jencso (Lead Instructor)
Department: Forest Management
Office: CHCB 423A (The Science Complex)
Phone: 243-6793
Email: kelsey.jensco@umontana.edu
Office Hours: Tuesday 10:30 – 11:30 AM and by appointment via email

Name: Dr. Cory Cleveland
Department: Ecosystem & Conservation Sciences

Office: CHCB 423B (The Science Complex)
Phone: 243-6018
Email: Cory.Cleveland@umontana.edu
Office Hours: Tuesday 10:20 – 11:00 AM and by appointment via email

Laboratory Schedule

Laboratory topics:

Lab #	Lab Week	Lab Assignment
1	8/29	No lab
2	*9/5	Geology and Soil Minerals (CC; Stone 306)
3	9/12	State Factors: Topography and Soil Formation (CC; field)
4	9/19	Forest Soils: Albic and Argillic Horizons (CC; field)
5	9/26	Topography and Soil Water Content & Soil Sampling (KJ; field)
6	10/3	Soil Physical Properties: Texture (KJ; Stone 306)
7	10/10	Soil Physical Properties: Density and Porosity (KJ; Stone 306)
8	10/17	Infiltration and Hydraulic Conductivity (KJ; field)
9	10/24	Soil Structure and Aggregate Stability (KJ; Stone 306)
10	10/31	Soil Engineering: Soil Liquid Limit & Plasticity (KJ; Stone 306)
11	11/7	Soil Chemistry (CC; Stone 306)
12	11/14	Digital Soil Surveys (CC; Stone 306)
13	11/21	Thanksgiving Week – No lab
14	12/5	Integration: Putting it all Together (CC; Stone 306)

Lab location & Time: 2:00 – 5:00 PM, M, T, W

Indoor labs will meet in Stone Hall 306. Field labs will meet at and depart from the loading dock behind the Science Complex (south side of the Clapp Building). Please be advised that all laboratory exercises start promptly at 2 PM.

Lab Book: The lab handouts will be available on-line (Moodle) prior to each week's lab. Please print them out and read them before coming to lab each week, and bring it to class. Unannounced quizzes prior to each week's lab will be given intermittently to evaluate your preparedness.

***Labor Day week, no Monday lab.** Students in the Monday section will still be responsible for the material presented in lab 1. Stone 306 will remain open for students to review mineral specimens and complete the lab on their own time during the week.

Lab Preparation: Prior to each lab, students should read the assigned material in the lab manual AND watch the recorded video for that day (as appropriate). Quizzes covering lab material are fair game.

Assignments: All lab reports should be turned in in class and are due one week after the lab meets. Late lab reports will receive a 10% deduction per day. When calculating final lab grades, we will drop the lab with the lowest grade. Finally, while you are free to work in small groups to go over lab data and discuss results, lab reports must be completed on your own, and submitted labs must be your own (unique) work. Copying or turning in nearly identical lab reports is considered plagiarism and is not acceptable; all parties will receive zeros for plagiarized lab reports.

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.

Class Attendance Policies

Students are strongly encouraged 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). This is recommended but not required.
- Come to class and be prepared to participate.
- Before lab, read the assigned material and be prepared to answer questions. Quizzes covering the reading are fair game.
- Check Moodle a few days following the lecture for possible changes to posted class materials and to begin review.
- Turn in assignments on time.

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 the factors that determine ecosystem structure and function is integral to understanding a range of critical environmental issues the world now faces. 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 the [Office for Disability Equity \(ODE\)](#). If you think you may have a disability adversely affecting your academic performance, and you have not already registered with ODE, please contact ODE in Aber Hall (1st floor) or 406.243.2243. We will work with you and ODE to provide an appropriate modification.

Course Withdrawal Deadlines and Drop/Add Policies:

[Course withdrawal deadlines](#) are published on the UM Website prior to the start of each semester. Please review them carefully.

Rules concerning academic honesty:

All students must adhere to UM policies on 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.

Health and Safety

COVID is still with us, but we are learning to live with it. As such, in most cases, we will meet in person for both lecture and reading group, but will all follow all relevant UM safety protocols. In the unlikely event that we are forced to temporarily transition to remote instruction, I will provide instructions on how that will unfold. While we are in class, I would encourage everyone to wear masks. Not required, and I may not always wear a mask while lecturing, but I would hope everyone will do their best to ensure the safety of others. If you do not feel well for any reason, please do not come to class. I will upload all my lecture materials to the course UM Box folder, so you should be able to keep up, even if you miss a lecture or two. please contact DSS for either an accommodation to be completely remote for the semester or for any safety protocol modification you may need (*depending on the needs we may or may not be able to accommodate the modification without requesting that you complete the class remotely*). If, at any point, students decide not to follow all safety protocols, I will immediately adjust any existing F2F activities and commit to full remote learning for the entire class for the remainder of the semester. More information and updates to UM's Healthy Fall plan can be found on the [UM website](#).

UM COVID Guidance

The university encourages COVID-19 vaccines and boosters, which are offered for both students and employees at the Health Services Pharmacy inside Curry Health Center.

Masks are only required inside Curry Health Center and in some medical/research laboratories on campus. This requirement will be clearly posted. Required or not, we respect those choosing to wear a mask to reduce the spread of respiratory viruses.

COVID testing for students is available at Curry Health Center. For employees, contact your primary care provider or visit a walk-in clinic. Free at-home tests can be [ordered online](#) or there may be tests available through the Health Services Pharmacy, call 243-5171.

Students who test positive need to [isolate](#) and not attend in-person classes for at least five days. (Please see link for CDC guidelines referring to isolation).

As with any other illness, please work to accommodate student absences. Consider ways to make course content available in the event of multiple student absences.

Refer to [this page](#) for additional resources and guidance on supporting students who miss classes due to illness.

UM Career Readiness Resources

The W.A. Franke of Forestry and Conservation is committed to the career success of our students. We encourage you to participate in [ElevateU](#) – UM’s signature career readiness program – to ensure that you graduate career-ready, with the education, skills, and tools needed to launch, carry-on, and pivot your post-graduation career. Participation in ElevateU is free and can be started at any time, no matter where you are in your academic or career journey. Get started by creating a profile on [Handshake](#) to search for jobs and internships or by [scheduling an appointment](#) with an [Experiential Learning and Career Success \(ELCS\)](#) career coach or advisor.