NEW MEXICO HIGHLANDS UNIVERSITY
Department of Forestry

Soil Science
~ The Living Skin of the Earth ~

FORS 4160/5160 with Dr. Michael Remke

Fall 2024

Image: Biological soil crusts on the Colorado Plateau in Utah.

Welcome to FORS 4160 – Soil Science. Soil science will cover a broad overview of the study of soils. This will include how soils are formed, soil taxonomy, and soil ecology. We will learn various skills and techniques for assessing soil parameters as well as some concepts as they pertain to soil health in forested and rangeland systems.

We will complement our foundational science with practical management and applications of soil science to various real world management scenarios. Our labs will contribute original research to the management of Piñon-Juniper Ecosystems.

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Figure 1: Western redcedar, a culturally important tree, has been used to make canoes for thousands of years.

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Course Information:

Course Number:		Instructor:
FORS 4160		Dr. Michael Remke
Term:	Credits:	Office:
Spring 2024	4	Ivan Hilton Science Building (HSCI) 135
Lecture Meeting Time:	Lecture Meeting Place:	Email: mremke@nmhu.edu
Tuesday, Thursday 11:00am-12:15pm	Zoom Room or HSCI 271A	Phone: (505)454-3320
Lab Meeting Time:	Lab Meeting Place:	Teaching Assistant:
Thursday 9:00-10:50am	HSCI 154	
Zoom information:		
Zoom Room; Password: Soil		
Website: https://www.mycoremke.com/teaching/fors4160soilscience		

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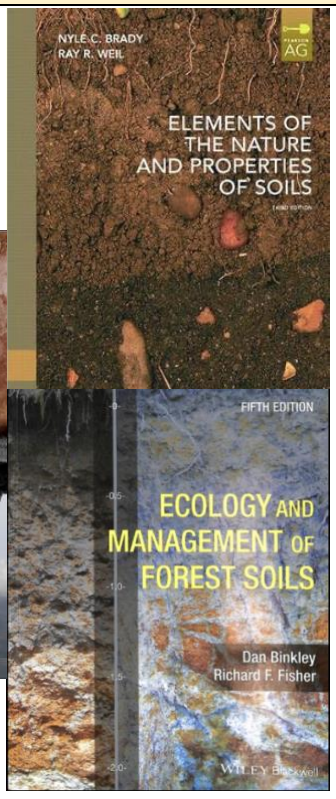
Student Hours:

~ Student hours are when my office door is open for any drop-in conversation.
Please use this time to discuss course material, career ideas, or anything else you really want to nerd out on.

Student Hours: Spring 2024		None of these times work?	
Day	Time		
Monday	12:00pm-2:00pm lunch hour	If none of these times work scan this QR Code to schedule an alternative time to meet	**Have a question or comment regarding class?** Scan this QR Code to submit an anonymous question or comment. This can be academic related or otherwise.
Tuesday	2:00pm-4:00pm seltzer hour		
Thursday	9:00am-11:00am coffee hour		
*Please bring your own beverage to enjoy with our conversation, if you want			

Textbook and readings: **Readings for this class will be uploaded to BrightSpace and no text book is required.**

The books to the right are what many lecture materials and lab materials will be based on and are highly recommended for your personal forestry library for supplemental readings and future reference, but I will not require readings from these books.



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Learning Goals:

NMHU Learning Goals:

1. Mastery of content knowledge.
2. Critical and reflective thinking skills.
3. Ability to communicate effectively.
4. Ability to use technology.

Society of American Foresters Learning Goals:

1. Understand the interdisciplinarity of forestry.
2. Critically think about how to sustain ecosystems for multiple objectives.
3. Students will understand the values offered by participants, landowners, communities, society, and the ecosphere.
4. Students will demonstrate an understanding of both scientific and traditional ecological knowledge systems.
5. Students will demonstrate professional and ethical behaviors and be able to critically think regarding ethics from diverse viewpoints.
6. Students will understand the value of diverse people, perspectives, and practices.

Course Learning Objectives (CLOs):

This course is focused on understanding common forest pathogens and insects and how to consider them in an integrated forest health lens.

Knowledge	Skills
1. Soil science concepts related to soil physical, biological and chemical properties	5. Be able to quantify and qualify various soil traits in field and lab settings
2. Appreciate the social-economic and ecological values of soils	6. Data summary and visualization skills
3. Understand how soil science principals relate to management	7. Writing and communication skills
4. Be familiar with basic geological concepts	8. Independent research and critical thinking

Course Structure:

Classroom Format: This course will be a mix of lectures, interactive activities, and hands-on learning in the laboratory format.

Course Attribute	Description
Lecture	The lecture will emphasize material content from readings and focus on concepts, theories, and principles of soil science. The lecture will be online, interactive, and participation is mandatory (see grades). There will be a daily quiz that will cover material from the previous lecture.
Lab	Lab will be based in a research lab (HSCI 154) and will teach us critical skills to studying and understanding soils. This will be hands-on. Attendance for lab is required to be in person with no option to attend via Zoom.

Assessments and Grading:

This class will be graded based on the following categories: **participation, examination, lab, and final project.** These categories are outlined in terms of there total points towards your final grade below.

Category	Points	Percent of total	Description
Participation	200	21%	5 points / lecture = 160 points + 40 points overall grade and professionalism
Quizzes	250	26%	25 x quizzes @ 6 points each
Lab	300	32%	15 labs @ 20 points each
Lab Project	200	21%	Final paper and self-assessment from lab reports
Total:	950	100%	

Graduate students also need 2 x labs lead and 2 x paper discussions lead. Please email Dr. Remke with labs that you want to lead and lecture topics you want to pick a paper for and lead the discussion. These are with an additional 30 points per activity x 4 total activities for graduate students.

Grades are reported to the university using the standard grading scale outlined below based on the percentage of your total grade. Please consider the rubric categories as opportunities for growth rather than focusing on your grade alone. Since your participation grade is a daily grade, you always have opportunity to improve in the next class.

Grade	Percent Range	Rubric Category
A	>90%	Excelling (4)
B	80-89.0%	Sufficient (3)
C	70-79.9%	Developing (2)
D	60-69.9%	Needs Improvement (1)
F	<60%	Absent

Policy	Description	Resources
Late assignments	Assignments will be posted to BrightSpace and will always be due at the beginning of the class period for which their due date is listed. Late assignments will result in a 10% grade deduction for every day they are late. Professional settings mandate proactive communication for missing deadlines, so this late assignment penalty can be waived with reasonable proactive communication.	How to communicate with your professor How to email your professor
Attendance	Attendance is mandatory. We will be meeting as a class on Zoom. I ask that your camera is on if you are able to. Should you miss class – Well shoot. Every day is special. The biggest consequence in my opinion is FOMO (Fear of Missing Out). In professional settings, missing an obligation is acceptable with proactive communication and a dedication to making up missed material independently. Interpret this for how you wish in your self-assessment.	How to catch up What to do when you miss class

In addition to the above policies, we will collaboratively develop the Rules Of Engagement as a class. This space is our community, so let us prioritize making our community a place that is inclusive and enjoyable for everyone.

Rules of Engagement:

We develop these rules as a group on the first day of class. The point is to ensure we have a respectful classroom setting everyone can agree with and feel comfortable with. If someone is violating these rules, we can politely point out the situation and remedy the problem as a group or as individuals within the group. The point is to ensure we are all empowered and supported rather than me, the professor, holding disproportionate rule-making and enforcing authority.

Example Rules:

1. Be present
2. Assume positive intent
3. Critique ideas, not people
4. If you identify a problem, present a solution as well
5. Make mistakes
6. If you take space, make space

Tentative Schedule:

Page 1/4	Day	Date	Class Type	Topic	Readings and Assignments Due
Week 1	Tuesday	8/13	Lab	Symphony of the Soil	Complete questions from the movie posted on Brightspace and online
	Tuesday	8/13	Lecture	Introductions and syllabus	
	Thursday	8/15	Lecture	Soils: The living skin of the Earth	
Week 2	Tuesday	8/20	Lab	Field trip: Observing Soils	
	Tuesday	8/20	Lecture	Soil formation and geology	
	Thursday	8/22	Lecture	Soil Structure	
Week 3	Tuesday	8/27	Lab	Field Trip: Sampling Soils	
	Tuesday	8/27	Lecture	Soil gas exchange	
	Thursday	8/29	Lecture	Soil water	
Week 4	Tuesday	9/3	Lab	Soil Texture	
	Tuesday	9/3	Lecture	Soil chemistry	
	Thursday	9/5	Lecture	Paths to dirt: organic matter	

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Page 2/4	Day	Date	Class Type	Topic	Readings and Assignments Due
Week 5	Tuesday	9/10	Lab	Soil pH and EC	
	Tuesday	9/10	Lecture	Soil taxonomy	
	Thursday	9/12	Lecture	Web Soil Survey	
Week 6	Tuesday	9/17	Lab	Soil Organic Mater	
	Tuesday	9/17	Lecture	Paths to roots: Mycorrhizal fungi	
	Thursday	9/19	Lecture	Soil food webs	
Week 7	Tuesday	9/24	Lab	Soil C/H/N	
	Tuesday	9/24	Lecture	Soil arthropods	
	Thursday	9/26	Lecture	Ecological stoichiometry	
Week 8	Tuesday	10/1	Lab	Soil EMH	
	Tuesday	10/1	Lecture	Biological Soil Crusts	
	Thursday	10/3	Lecture	Physical Crusts	

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Page 3/4	Day	Date	Class Type	Topic	Readings and Assignments Due
Week 9	Tuesday	10/8	Lab	Fall Break	
	Tuesday	10/8	Lecture	Fall Break	
	Thursday	10/10	Lecture	Soil Erosion	
Week 10	Tuesday	10/15	Lab	Soil Water Holding Capacity	
	Tuesday	10/15	Lecture	Soil management: Physical Disturbance	
	Thursday	10/17	Lecture	Soil Management: Chemicals	
Week 11	Tuesday	10/22	Lab	Data entry and summary	
	Tuesday	10/22	Lecture	Soil amendments	
	Thursday	10/24	Lecture	Biochar	
Week 12	Tuesday	10/29	Lab	Data analysis	
	Tuesday	10/29	Lecture	Soil Health	
	Thursday	10/31	Lecture	Soil Health	

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Page 4/4	Day	Date	Class Type	Topic	Readings and Assignments Due
Week 13	Tuesday	11/5	Lab	Report Draft	
	Tuesday	11/5	Lecture	Forestry: Best management and more	
	Thursday	11/7	Lecture	Range: The root of it all	Submit report draft
Week 14	Tuesday	11/12	Lab	Draft revisions	
	Tuesday	11/12	Lecture	Ethnopedology	
	Thursday	11/14	Lecture	Course wrap-up	Submit draft revisions
Week 15	Tuesday	11/19	Lab	Report writing	
	Tuesday	11/19	Lecture	Report Writing	
	Thursday	11/21	Lecture	Report Writing	
Week 16	Tuesday	11/26	Lab	Presentations	Final paper due/Presentation due
	Tuesday	11/26	Lecture	Presentations	
	Thursday	11/28	Lecture	No Class: Fall Recess	
FINALS No in person final; Happy Holidays!					

Course Policies:

Policy	Description	Resources
Academic Integrity Policy:	New Mexico Highlands University students and faculty are expected to maintain integrity through honesty and responsibility in all their academic work. Academic dishonesty includes plagiarism, **Cheating**, **Collusion**, **Facilitation**, **Fabrication**, **Multiple Submissions**, and **Falsification of Records**. ChatGPT and other Artificial Intelligence (AI) tools help look up questions or ideas; however, copying and pasting AI-generated answers is still academically dishonest.	This course follows the Highlands Academic Integrity Policy as described in the catalog: Academic Integrity Policy
Cell Phone and Electronics Policy	Cell phones can both distract and enhance the learning environment. We will develop rules regarding cell phone use together as a class, please reference the **Rules of Engagement** for more details.	Smart Phones in Classrooms 10 Ways A Smartphone can help you Learn
Preparedness and Etiquette Policy	Having the proper etiquette for the day means having a good attitude and being part of the team that is our class. Specific **Rules of Engagement** will be made on the first day of class and added to this syllabus.	Packing checklist Field Biology Checklist

Rubrics:

Participation Assessment Rubric		Needs Improvement (1)	Developing (2)	Sufficient (3)	Excelling (4)
Behavioral Trait	Engagement	Student does not participate and lacks interest or curiosity in material covered	Student sometimes participates and seems curious for only some material covered	Student participates most days and is interested in some, but not all of the material covered	Student participates daily and encourages participation of peers. Student is curious in material covered
	Focus	Student is distracted and often dedicating energy to items besides the tasks on hand	Student is often distracted with other items during activities, presentations, and instructions	Student is sometimes distracted with other items during activities, presentations and instructions	Student works on task and is attentive during presentations, instructions, and activities
	Attitude	Student is negative and complains about circumstances without being proactive in resolving circumstances	Student is seldom positive and if negative about circumstances at least attempts to resolve the issue	Student is mostly positive but is mostly focused on self and not others	Student is positive daily regardless of circumstances and helps classmates
	Preparedness	Student came dressed inappropriately for weather or activity	Student forgot something at home but had the foresight of preparedness	The student had most needed items but would benefit from more organization	Student had all needed items and was well organized.
	After Action Review	Student is constantly distracted during class	Student is sometimes distracted.	Student often participates during after action reviews	Student is attentive and engaged during

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Written Assessment Rubric		Needs Improvement (1)	Developing (2)	Sufficient (3)	Excelling (4)
Writing Component	Clarity	The purpose of the student work is not well-defined. Central ideas are not focused to support the thesis. Thoughts appear disconnected.	The central purpose of the student work is identified. Ideas are generally focused in a way that supports the thesis.	The central purpose of is clear and ideas are almost always focused in a way that supports the thesis. Relevant details illustrate the author's ideas.	The central idea is clear and well supported, supporting ideas are focused and details are relevant.
	Organization	Information and ideas are poorly sequenced (the author jumps around). The audience has difficulty following the thread of thought.	Information and ideas are presented in an order that the audience can follow with minimum difficulty.	Information and ideas are presented in a logical sequence which is followed by the reader with little or no difficulty.	Information and ideas are presented in a logical sequence which flows naturally and is engaging to the audience.
	Mechanics	There are five or more misspellings and/or systematic grammatical errors per page or eight or more in the entire document. The readability of the work is seriously hampered by errors.	There are no more than four misspellings and/or systematic grammatical errors per page or six or more in the entire document. Errors distract from the work.	There are no more than three misspellings and/or grammatical errors per page and no more than five in the entire document. The readability of the work is minimally interrupted by errors.	There are no more than two misspelled words or grammatical errors in the document.
	Creativity	The student work is difficult to distinguish as its own.	Some elements of the work are unique	Most of the work is unique	The student work is unique and stands out as a novel perspective or writing

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Self-Assessment Rubric		Needs Improvement (1)	Developing (2)	Sufficient (3)	Excelling (4)
Self-assessment Component	Knowledge	I feel I did not learn new knowledge	I learned little new knowledge in this class.	I learned many new knowledge, but some knowledge was not new.	I feel like I learned lots of new knowledge.
	Skills	I feel like I did not gain new skills	I learned few new skills in this class.	I learned many new skills, but some skills were not	I feel like I learned lots of new skills
	Comfort	I feel like I am uncomfortable in topics discussed in class	I did not increase my comfort much from the beginning of class	I am generally more comfortable, but some things still challenge me	I feel my comfort with material in course has increased.
	Confidence	I feel like I am not confident in class	I did not increase in confidence in forestry in this class at all.	I feel fairly confident but still find material I am not so confident in	I feel more confident as a forester than I did at the beginning of class
	Participation	I feel like I rarely participate throughout this class in the class	I only sometimes participated throughout the class	I find myself participating most of the time.	I feel like by the end of the class I was participating more.
	Excitement	I feel unexcited about the topics in the class.	I feel only sometimes excited about things in this class.	I am generally excited about material, but some topics still are not interesting to me.	I feel very excited about learning more about forestry.