

Soils - 2110

Fall Semester 2023 (3 Credit hours)

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Office-hours

Usually available Tues and Thur 9 am-4 pm (*call or email first if you're making a special trip to campus*) or by appointment

CLASS SCHEDULE:

Days: M, W, F Aug 16 – Dec 1 at 9:00-9:50 am *in person*

Room: GT 200

Midterm Exam: Wed Oct 11

Final Exam: Mon Dec 4 (8 -10 am) in GT 200

Holidays on: Mon Sept 4; Nov 20-24 (Thanksgiving)

IMPORTANT DATES:

Last day to **add** class using add/drop slip: Fri, Aug 25

Last day to **drop** course with refund AND **opt out** of e-book: Fri, Sep 1

Last day to drop with "W": Thurs, Oct 12

Last day to withdraw from university (no refund): Fri, Dec 1

COURSE OVERVIEW: Soil is a reusable, but not necessarily *renewable* natural resource that can store water and nutrients to support vegetation as well as decompose and recycle wastes and contaminants. Soil comprises the critical zone where the hydrosphere (water), atmosphere (gases), lithosphere (rocks and minerals), and biosphere (organisms) all intersect. Soil is the world's most biodiverse habitat and contains over 50% of all species. This course is for undergraduate students interested in learning basic soil science and its applications to Environmental Science, Natural Resources, Plant Science, and Agriculture.

OBJECTIVES: To present a broad overview of the nature and properties of soil including their physical, chemical, and biological properties, how soils form, and how they influence our lives and environment. The focus of the course will be towards agronomic and ecological aspects of soils rather than engineering or mechanical uses of soil (see Soil Mechanics classes in the College of Engineering). See the Specific Learning Goals for this class below.

PREREQUISITE: CHEM 1120G *and* MATH 1215, *or* CHEM 1215G.

ATTENDANCE: Attendance in lecture is vital if you want a good grade. When class attendance is noticeably low, or students repeatedly come in tardy, I may administer a "pop" quiz or graded in-class exercise at the beginning of class. My goal is to keep you engaged and learning, not just passively sitting through lectures; but in order to accomplish this, everyone has to come to class prepared, on time, and having reviewed the material in advance. Scheduled pre-class reading assignments will be submitted and graded online in Canvas and are due before the beginning of class.

The midterm and final exam are on Wed Oct 11 and Mon Dec 4. If you will be out of town for an approved University activity on those days, please notify me *in advance* so that other arrangements can be made.

CANVAS: All course materials and grades will be posted on Canvas (Learn.nmsu.edu). I will post announcements, lecture pdfs, reading assignments, previous exams, quantitative assignments, links to useful sites and tutorials, as well as other material. There are computer labs around campus for your use. If computer access is a problem, let me know immediately so that other arrangements can be made to facilitate your learning. For technical help and locating resources, see <http://studenttech.nmsu.edu/computer-labs/>

GRADING: A = 90-100%, B = 80-89%, C = 70-79%, D = 60-69%, F <60% (Fractional grading will be +/- 2.5% within the ranges except that an A+ can only be earned with $\geq 100\%$)

Homework (10% Canvas pre-class readings, 40% quantitative)	50%
In-Class activities & Canvas quizzes (drop 2 lowest quiz scores)	20%
Midterm Examination (due by Wed Oct 12 in class or on Canvas)	15%
<u>Final Examination (Comprehensive, Monday Dec 5, 8-10 am)</u>	<u>15%</u>
Total	100%
Extra credit (up to 2.5%) not factored in until end of semester	102.5%

GRADE DISPUTES: If you feel that graded material (exam, assignment, or quiz) has been incorrectly *tallied*, please bring it to my attention immediately. If you have a disagreement with the amount of partial credit you receive on an exam question or assignment, **explain your case in writing** and submit for a response **within one week** of the return of your exam or assignment. Include your original assignment or exam as well. In the case of multiple-choice questions, you only get credit if you select the *single best answer*. For short answer or essay question, you will only get full credit if you answer the entire question. Answers on 'fill in the blank' type questions must be spelled correctly for the computer to grade, but I will review all missed questions manually and look for answers that are close enuf.

GRADE POSTING: Grades for exams, quizzes, assignments, and your final grade will be posted on Canvas. Because Canvas does not count dashes (-) in your calculated grade, your true grade is not correct until everything is entered. I will not post your grades in a public location. Other students will not be able to see your grades unless you give them your login and password identification. To comply with FERPA laws, faculty and administrators are required to use student **NMSU email accounts** for contact and information about grades or other sensitive information.

QUIZZES AND EXAMINATIONS: Quizzes will be taken in Canvas or may be given at the beginning of class and will include questions over the lectures and assigned readings (from the textbook and/or postings on Canvas). **Because two of the quizzes will be dropped, no makeup quizzes will be given.** Online quizzes will only be open for a specific amount of time and may only be attempted once. Quizzes and exams will include short answer, compare/contrast, multiple choice, and calculations (*use a calculator, not a cell phone*). The final exam is comprehensive but will emphasize the second half of the course. Examples of old exams are posted on Canvas. I will try to incorporate lots of active learning exercises into the class, but this depends on you showing up, completing the reading, and being prepared.

HOMEWORK: Homework assignments will include calculations used in soil science and will be submitted on paper. Similar problems will be on the quizzes and exams. All work, including conversions and units, must be shown with the answers in order to earn full credit. I must be able to read your writing, so please be neat – you do NOT have to type up your assignments, but you must write legibly (this is also important in your career). Everyone will have their own data and thus their own answers to the calculations, so I encourage you to work together. If you cannot turn in your assignment in class on the day it is due, you may leave it in my **department office mailbox** in **Skeen Hall 127N** by **5 pm**. Do **not** slip your assignments under my office door – they have been lost or damaged in the past.

LATE HOMEWORK POLICY: My goal is to give you adequate time and instruction to complete your assignments. Unlike the "real world", I will accept late assignments **up to a week after the due date** unless other arrangements are made. **Ten percent will be deducted for any late assignment.**

EXTRA CREDIT: Occasionally there will be opportunities to attend seminars, films, club events, help with outreach activities, etc that may provide some learning opportunities and "extra credit". These will be announced in class and posted on Canvas along with the requirements needed to receive credit. If you have suggestions for such activities, please let me know via email and include all the details. Cumulative extra credit, referred to as "miscellaneous" in Canvas could add up to 2.5% to your class letter grade.

Code of Conduct: The Student Code of Conduct defines academic misconduct, non-academic misconduct and the consequences or penalties for each. The Student Code of Conduct is available in the NMSU Student Handbook online <http://studenthandbook.nmsu.edu/>

Academic misconduct is explained here:

<http://studenthandbook.nmsu.edu/student-code-of-conduct/academic-misconduct/> Academic misconduct will not be tolerated and will result in severe penalties including an F in the class. This means not copying your classmates' answers and no plagiarism.

According to the NMSU Advising website: *“Estimated study time per credit during a 15-week semester is 2-3 hours per week for each enrolled credit.”*

Please silence your cell phones while in class (**unless there is an emergency, please don't text or take calls during lectures or exams; you cannot use your phone as a calculator in exams**).

My goal is that everyone in the class, including myself, be treated with respect and dignity. I will try my best to make the class an enjoyable and worthwhile investment of your time and energy and I expect you to do your part by studying, coming to class prepared and on time, and participating. There is a reason that this course is required for your major and I sincerely hope that you will gain an appreciation, if not love, for soil by the end of this course.

Discrimination and Disability Accommodation: Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act Amendments Act (ADA) covers issues relating to disability and accommodations. If a student has questions or needs an accommodation in the classroom (all medical information is treated confidentially), contact:

Disability Access Services <https://studentlife.nmsu.edu/disability-access-services1/index.html>
Corbett Center Student Union Room 204
575-646-6840 das@nmsu.edu

New Mexico State University, in compliance with applicable laws and in furtherance of its commitment to fostering an environment that welcomes and embraces diversity, does not discriminate on the basis of age, ancestry, color, disability, gender identity, genetic information, national origin, race, religion, retaliation, serious medical condition, sex (including pregnancy), sexual orientation spousal affiliation, or protected veteran status in its programs and activities, including employment, admissions, and educational programs and activities. Inquiries may be directed to Laura Castille, Executive Director, Title IX and Section 504 Coordinator, Office of Institutional Equity; equity@nmsu.edu.

Title IX prohibits sex harassment, sexual assault, intimate partner violence, stalking and retaliation. For more information on discrimination or Title IX, or to file a complaint contact:

Office of Institutional Equity (OIE) – O'Loughlin House, 1130 University Avenue
Phone: (575) 646-3635; E-mail: equity@nmsu.edu Website: <http://equity.nmsu.edu/>

Other NMSU Resources:

NMSU Police Department:	(575) 646-3311	www.nmsupolice.com
NMSU Aggie Health and Wellness (medical and counseling services):	(575) 646-1512	www.wellness.nmsu.edu
NMSU Dean of Students:	(575) 646-1722	
For Any On-campus Emergencies:	911	

OTHER HELP: The Student Success Center is a valuable resource for help in note taking, test taking, time-management and other useful academic skills. The website is very informative (<http://ssc.nmsu.edu/>) or you can visit in person at Hardman and Jacobs Undergraduate Learning Center, Room 128. I am happy to see you during office hours and provide whatever help I can...I look forward to working with all of you!

SOIL 2110L: The lab is a separate 1-credit course that is only required for certain majors. See your advisor if you are unsure whether you are required to take it. It is a fun hands-on experience that helps explain many of the lecture concepts, so I encourage you to enroll in it if you have the time and interest.

Labs will begin on Wednesday, Aug 23 and Thursday Aug 24 at 1:30 pm. Wear covered shoes and be prepared to get dirty. Your Lab TA will cover safety concerns and work requirements for the class.

Overarching Principles of Soil Science:

1. Everything is connected. Soils represent the critical zone or intersection between the hydrosphere, lithosphere, atmosphere, and biosphere. A good understanding of soil science requires knowledge of other disciplines and the application of that knowledge to the Earth's 'skin'.
2. Soils are not inert; they are dynamic and reactive physically, chemically, and biologically.
3. Soils are heterogeneous; what is characteristic for one location or soil type may be different at other locations with different conditions – this is one of the challenges of studying soil science and one of the things that makes it most interesting.
4. Soils perform several important functions that are vital to agriculture and the environment; good soil supports a high quality of life. One of my goals is to help students realize how soils are useful and relevant to their own discipline since SOIL 2110 is required for many majors.
5. Soil Science is a quantitative discipline and math is required to characterize and understand the chemistry, physics, and biology of the soil environment.

Specific Learning Goals for SOIL 2110 are assessed using quizzes, mid-term and final exams, in-class exercises, and quantitative assignments, ungraded discussions, extra credit activities, and essays. Successful careers usually require interdisciplinary work and an ability to communicate with others.

1. Identify several functions and roles of soil specific for your major.
2. Describe soil processes and explain how they interact with the environment.
3. Describe how soil is formed, lost, or changed in response to factors such as climate, topography, time, parent material and biota (including humans).
4. Explain how soil is alive, dynamic, and reactive as well as why it is a valuable natural resource.
5. Apply the principles of good sampling techniques knowing that the properties of soil change with distance and time (spatial and temporal heterogeneity); Soil analysis is only as good as the sample itself (representative sample, correctly preserved, etc); interpret a soil analysis report.
6. Calculate and interpret some physical and chemical properties of soil including: bulk density, texture, porosity, pH, cation and anion exchange capacity, base saturation, plant available water, field capacity, wilting point, total dissolved solids, electrical conductance, sodium adsorption ratio, etc.

READING ASSIGNMENTS

TEXT BOOK: Elements of the Nature and Properties of Soils, Brady, N.C. and R.R. Weil (*4th edition*) is available to all students as an e-book on Canvas during the class for a fee. Students have the option to opt out in CANVAS, by going to [Follett - Customer Portal](#) and logging in using their NMSU email, or by emailing 2218txt@follett.com. **WARNING!** it is not recommended that students opt out of Inclusive Access Courseware as these are often codeless, auto integrations and using a "code" purchased from other sources may be difficult to redeem for the correct course. Be sure and include your name, Aggie ID # and the course you wish to be opted out of. See the link below on how you can opt out through Canvas: <https://solve.redshelf.com/hc/en-us/articles/360013142634-How-to-Opt-Out>

*Students will have until **September 1st** to opt out of the program, whether you stay in this course or not. If a student opts out of the course e-book and realizes it was not the best option for them, you have the option of opting back in **BEFORE** September 1. **If you drop the course, you will NOT be automatically removed from the e-book option, so don't forget to do both!***

New and used textbooks may also be available at the NMSU Bookstore, online, or on reserve in Zuhl Library. Readings from the textbook (submitted on Canvas) will constitute at least 10% of your grade. You will also need a scientific calculator (e.g., TI-30) for the assignments and exams. Textbook page numbers below are based on the *fourth edition* of Brady and Weil and vary with earlier editions:

Ch. 1, p 1-27: Soil composition and importance as a natural resource (general information, overview of soils, functions of soil).

Ch. 2, p 29-70: Soil origin and development (weathering, parent material, soil-forming factors, profile).

Ch. 3, p 72-115: Soil classification (taxonomy, soil orders, soil survey) and overviews of each Order.

Ch. 4, p 117-152+161: Soil physical properties (texture, structure, density, pores, color, temperature, water holding capacity, tillage); skip the engineering properties of soil for this class.

Ch. 5 – 6, p 164-195 and 197-226* and 229-237: Soil water (infiltration, percolation, root uptake, energy concepts, hydrologic cycle, water quality, drainage, irrigation),

Ch. 7, p 239-273*: Soil aeration and temperature (wetlands, gas exchange, oxidation-reduction, thermal properties)

Ch. 8, p 274-310**: Soil chemistry (clays, mineralogy, charge, cation exchange capacity, anion exchange capacity, sorption); except section 8.5.

Ch. 9, p. 312-365***: Soil pH (acid soils, alkaline soils, amendments to modify pH), Soil salinity, sodicity, reclamation

Ch. 10, p. 369-383 and 406-415: Organisms and ecology of the soil; biogeochemical cycles and soil.

*note that Ch 6 and Ch 7 are filled with very practical information that we will review quickly, but keep as a reference for later use in your careers or even at home.

**Ch 8 “scares” students because of all the chemistry – but the concept is important, and I have lots of resources that help explain it more clearly, so don’t get discouraged by the book – it’s hard to learn this subject by reading about it!

***we’ll probably “gloss over” a lot of Ch 9 but I will try to distill the critical points for you.

Updated Office of Institutional Equity text for FA22 Syllabi (8/16/2022):

New Mexico State University, in compliance with applicable laws and in furtherance of its commitment to fostering an environment that welcomes and embraces diversity, does not discriminate on the basis of age, ancestry, color, disability, gender identity, genetic information, national origin, race, religion, retaliation, serious medical condition, sex (including pregnancy), sexual orientation, spousal affiliation, or protected veteran status in its programs and activities, including employment, admissions, and educational programs and activities. **You may submit a report online at equity.nmsu.edu. If you have an urgent concern, please contact the Office of Institutional Equity at 575-646-3635.**

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Office of Institutional Equity (OIE) - O'Loughlin House, 1130 University Avenue
Phone: (575) 646-3635
E-mail: equity@nmsu.edu
Office of Institutional Equity Website (<https://equity.nmsu.edu>)

Please visit <https://provost.nmsu.edu/faculty-and-staff-resources/syllabus/policies.html> for university policies and student services, including Discrimination and Disability Accommodation, academic misconduct, student services, final exam schedule, grading policies and more.