

# Soil Chemistry

## Syllabus - Fall 2020

**Instructor:** April Ulery

**Office Location:** Skeen 340N; however, all meetings will be held by Zoom.

**Email:** [aulery@nmsu.edu](mailto:aulery@nmsu.edu)

**Phone:** 575-646-2219 or 575-649-3250 (cell)

### Office Hours:

Tuesday and Thursday 2-3 pm or by appointment

Response to emails and calls will be within 24 hours unless I am traveling.

**Course:** SOIL 424 M01

**Credit Hours:** 3

### Prerequisite(s)

The prerequisite(s) for this course are SOIL 252 or two semesters of Chemistry. Please see me if you have not satisfied the course prerequisites.

### Cross listed course(s)

This course is cross-listed as GEOL/CHEM 424 and taught concurrently with SOIL 479. You may not earn credit for both this course and the cross-listed course. Completion of the course under either cross-listing will satisfy any requirements that exist under either cross-listing.

**Delivery method:** Hybrid (more than 20% of face to face instruction is replaced with online)

### Class Meeting Days and Times

Monday, Wednesday, Friday 12:30 PM - 1:20 PM

### Online Preparation

Students should plan to spend at least 5-7 hours per week on this course, including reading, assignments, and assessments. There will be reading guides and self-tests posted on Canvas that should help keep you organized and on track.

## Required Technical Skills

Taking an online/hybrid course requires a number of technical skills as well as other soft skills. However, at a minimum you will need to meet certain technology responsibilities to complete work for this course. If you have questions about technical requirements for the course, please contact me immediately.

To begin in this course, you must:

1. Read this syllabus carefully and contact me immediately if you have any questions. You are responsible for the content and assignments in this syllabus.
2. Be able to obtain access to an internet connection, preferably broadband, and a working **computer** for the duration of this course. **Let me know immediately if this is not feasible** (cell phone access of course materials is not sufficient).
3. Be Proficient with Microsoft© Office applications.
4. Be able to conduct research searches on the Internet; see the [libguide for this course](#), the [NMSU Library](#) and [Research Help for Students](#)
5. Find credible resources on the Internet.
6. Be able to send and receive emails and email attachments in and out of class. (I'm also willing to accept photos of your assignments taken with a phone camera and sent via text to my cell phone at 575-649-3250)
7. Know how to change your Canvas Notification settings.
8. Know how to read email in Canvas - and check it regularly, or give me your cell phone number so that I can text you and let you know that you should check for new resources or announcements on Canvas.
9. Maintain backups of all work you create for this course.

## Course Expectations

Students are expected to watch pre-recorded or live lectures, read textbook and other resources, and practice applying the material learned to weekly problems. Everyone should participate in Discussion boards, quizzes, and Q&A either in class or online. All assignments will have individualized data so students are encouraged to work together (via zoom or in person practicing appropriate social distance).

## Netiquette

Essentially, treat others the way you would want to be treated:

1. Always be polite and respectful in online correspondences and in the Discussions.
2. Question ideas, not people.
3. Do not attack. Listen actively to others views; everyone has a voice.
4. Pay attention to your word choice. Be sensitive to others.
5. Use spell check.
6. Avoid using all caps. (All caps is considered to be shouting.)

# Course Organization

Besides the textbook, everything that is needed for this course will be provided online via Canvas. I am also happy to provide hard copies of any notes or papers - just let me know what you want and how to get it to you (i.e. mailing address).

The course will be organized by modules in Canvas and every module/unit will include pdfs of the PowerPoint slides, notes, additional resources and references including video links and recorded lectures. There will be a separate module for assignments that include the questions, excel spreadsheets of student-specific data to be used in those assignments, helpful hints and resources online to illustrate how to solve problems, etc.

I don't anticipate having the entire course available online at the beginning of the semester, so you will need to work at my pace and won't be able to get too far ahead, or behind. For those who cannot meet synchronously, or in person, at the scheduled class times, you are welcome to view the lectures at a more convenient time (e.g., when your internet is more stable).

## Technology Requirements

### Supported Software

- [Canvas LMS](#)
- [Zoom](#)
- [Adobe Connect](#)
- [Panopto](#)
- [Canvas Studio](#)
- [Adobe Reader](#) (for reading PDF files)

### Computer and Operating System

- 4GB of RAM or higher
- Dual Core 2GHz or higher (Intel Core i5 processor or equivalent)
- Microphone (built-in, wired, USB, wireless or Bluetooth)
- Web camera (built-in or USB)

Operating System:

- Windows 10 or higher
- OS X 10.13 or higher

A list of Academic Technology favorite microphones and USB webcams can be found at <https://learning.nmsu.edu/minimum-technology-requirements/>

### Internet

- Broadband connection (25 Mbps download, 3Mbps upload as defined by the [FCC](#))
- Wired connection (ethernet) preferred
- Stable wireless connection is acceptable
- Use the [NMSU Checs Speedtest](#) to test your internet speed

## Web Browsers

- Latest two versions of [Chrome](#)
- Latest two versions of [Firefox](#)
- Javascript must be enabled

Use only the latest version of Google Chrome or Mozilla Firefox for Canvas. Safari, Internet Explorer and Microsoft Edge have known issues that can interfere with performing basic tasks within Canvas. The links to ensure you have the latest version are listed below:

- [How to update Google Chrome](#)
- [How to update Mozilla Firefox](#)

## Academic Learner Services Support

NMSU provides students with academic resources such as tutoring, final exam schedules, library and research, and transcript information on the [NMSU Current Student webpage](#).

## Student Support Services

[Aggie One-Stop](#) is student service center designed to help both undergraduate and graduate students manage the business of going to college, as well as resources to connect with university departments. Information and answers about admissions, financial aid, registration, bill payment and student records, advising, housing, paring, and health & wellness can all be found in a single location.

Website: <http://onestop.nmsu.edu>

Phone: 575-646-NMSU (575-646-6678)

Email: [onestop@nmsu.edu](mailto:onestop@nmsu.edu)

## Technical Support

The ICT Customer Service Center is equipped to deal with all of your information technology (IT) and telecommunications needs at NMSU. The ICT Customer Service Center hours of operation are from 8:00 am until 5:00 pm Monday through Friday Mountain Time. Please feel free to contact them at 646-1840 or via e-mail at [helpdesk@nmsu.edu](mailto:helpdesk@nmsu.edu).

You can also go to the [Student Technology Help](#) web page and [Student Resources](#) located at the [Canvas](#) web page for additional information on Canvas.

# Accessibility of eLearning Tools

Contact <http://sas.nmsu.edu/> for assistance or if you need accommodation.

Some general or common VPAT links.

- [Adobe Products: Section 508 VPATs for \(Adobe Connect 9, Adobe Acrobat, and more\)](#)
- [Apple Products: Section 508 VPATs for](#) (Safari Web Browser, Mac OS X, and more)
- [Microsoft Products: Section 508 VPATs for](#) (Internet Explorer, Office, Skype, and more)
- [Google Products: Section 508 VPATs for](#) (Google Earth, Chrome Web Browser, Google Docs, and more)
- [Firefox Web Browser: Section 508 VPAT \(version 3.5 and up\)](#)

## Course Schedule

The course will cover the following topics:

### **I. Overview of Soil Chemistry (1 week)**

1. Environmental Chemistry
2. Chemistry applied to soil
3. Math and units applied to soil

### **II. Description of Soil Components (3-4 weeks)**

1. Inorganic Solids and Soil Mineralogy
2. Soil Organic Matter
3. Soil Solution

### **III. Processes and Properties Important in Soils (1-2 weeks each)**

1. Chemical Weathering/Salinity/pH and Acidity
2. Ion Exchange/CEC and AEC/constant and variable charge
3. Sorption/Inner and outer sphere complexes/isotherms/ $K_{oc}$ ,  $K_d$ , and partition coefficients
4. Redox Chemistry

## Syllabus Modifications Statement

This syllabus is subject to modification in that the schedule and specific topics covered are subject to change.

## **Class Meeting Location**

GT 336 (subject to change)

## **Required Texts**

Essington, M.E. 2014. *Soil and Water Chemistry, An Integrative Approach*. 2<sup>nd</sup> ed. CRC Press. Boca Raton. (1<sup>st</sup> edition is ok, but has a few errors).

## **Required Materials**

Scientific calculator (need to be able to do exponents, logs, square roots, etc).

## **Optional/Recommended Texts and Materials**

Just about any Soil Chemistry textbook will work for this class - some of the better ones are:

Sparks, D.L. 2003. *Environmental Soil Chemistry 2<sup>nd</sup> Ed.*, Academic Press, San Diego, CA

Bohn, McNeal, O'Connor. 1985 or 2001. *Soil Chemistry 2<sup>nd</sup> or 3<sup>rd</sup> Ed.*, Wiley & Sons, New York, NY.

Sposito, G. 1989. *Chemistry of Soils*, Oxford Univ. Press, New York, NY.

Evangelou, V.P., 1998. *Environmental Soil and Water Chemistry*, Wiley & Sons, New York, NY.

McBride, M.B. 1994. *Environmental Chemistry of Soils*. Oxford Univ. Press. New York, NY.

You could even get away with referring to a comprehensive soil science textbook like Brady and Weil *The Nature and Properties of Soil (>9th ed)*; or *Elements of the Nature and Properties of Soil*, any edition.

## **Course Overview**

Soil Chemistry is the study of the composition, properties and chemical reactions of soils. Many of the same chemical principles that apply to decontaminating soil also pertain to efficient fertilizer use and optimizing crop growth. This SOIL course is cross-listed under chemistry and geology which illustrates the interdisciplinary nature and applicability of the subject.

## Course Learning Objectives

The objectives of this course are to be able to describe and explain

- the solid and liquid phases of soil;
- the chemical reactions and processes that occur between soil phases;
- how soil chemical processes can be managed to promote plant productivity and land remediation, including the techniques and calculations used.

## Assignments & Exams

Grades are based on weekly quantitative assignments (70%), one midterm and one final exam (10% each), Canvas quizzes, discussion posts and/or participation (10%). Homework grades will be reduced by 10% per week if late. All assignments will be submitted electronically (Canvas, email, texting). Students enrolled in 479 will present demonstrations or presentations and they will have more in-depth problem sets than 424 students.

Our exams (one midterm and one final) will be comprehensive and include short answer, calculations, and critical thinking questions involving the application of principles to environmental and agricultural problems based on the assignments and readings. I will post previous exams on Canvas and provide study guides as well as example questions.

## Proctored Exams Information

This online course doesn't have proctored exams.

## Final Exam

I was unable to find our course time on the final exam schedule (<https://records.nmsu.edu/final-examination-schedule/>) so I will be flexible on times, but I'd like to have all finals done by Thursday, Dec. 10 at 5 pm.

## Attendance

Many studies have shown that attendance is positively correlated to grades, particularly for those students who are unwilling to read the material and expect the instructor to distill everything for them. As long as the work gets done (including completing quizzes, discussion posts and lecture activities that are worth 10% of the grade) and the student is able to answer questions about Soil Chemistry, physical or even online presence means nothing. I will endeavor to make everything available to students in person, or online synchronously or asynchronously and even make myself available to help individually as needed.

## Religious Observances and Authorized Absences

NMSU values diversity and the university supports cultural and religious inclusiveness. If your participation in cultural or religious observances (e.g. religious holidays, spiritual observances) conflicts with a particular class session, please notify me in writing and ahead of time to be excused from class for such observances.

## Late Assignment and Make-up Work/Exams

It is much easier to grade assignments when they are all submitted at about the same time, so assignments will lose 10% of their grade for every *week* that they are late. Exceptions will be made in the case of medical and family issues of course.

## Multiple Submissions

I find that we can learn from our mistakes, so I will allow the option in some cases to correct missed questions on assignments and exams and resubmit those for up to 50% more credit within one week. Be sure and include the original assignment or exam along with the corrected version.

## Grades

Letter grades will be assigned according to the following:

90-100% = **A**; 80-89.9% = **B**; 70-79.9% = **C**; 60-69.9% = **D**

**Grade disputes:** Except for a point tally error, which should be reported immediately, if you have a disagreement with the key or with the amount of partial credit you receive on a problem or assignment, **plead your case in writing** and submit for a response **within one week** of the return of your exam or assignment. Include a copy of the problem(s) or assignment in question.

Students should be aware that Canvas has an “automatic” grade calculator that does not always reflect the true weighting of assignments and I may not have every assignment “loaded” until the end of the semester.

### **S/U Grading Option:**

Students enrolling under the S/U grading option must earn **C or above** to receive an “S”. Students must elect the grading option prior to the last day to add a class. Students should check the course catalog for eligibility and availability of the S/U Option generally.

## Incomplete Grades

Under university policy, incompletes may be given only if a student has a passing grade at mid-semester (the last day to withdraw from a class) and is precluded from successful completion of



the second half of the course by a documented illness, documented death, family crisis or other similar circumstances beyond the student's control. An incomplete should not be given to avoid assigning a grade for marginal or failing work. Instructors assigning the "I" grade can choose to make the "I" grade permanent, and require students to register for the course in a subsequent semester to earn credit (Option A), or may allow students to complete remaining work in the course by an identified deadline (within one year) and then submit a change of grade form to substitute the earned grade for the "I" grade (Option B). Requirements for removal of the "I" grade under Option B must be clearly stated on the "I" grade form. Incompletes do not automatically convert to F's if the course is not completed. Under Option B, the faculty member can state on the form that an incomplete will become an F, but then it is incumbent upon the instructor to process a change of grade form to accomplish that result.

**Note: Grades in this course are assigned without Fractional Grading**

## **Important Dates for Fall 2020**

Students may add courses through **Thursday, August 20, 2020** without instructor permission and through **Monday, August 28, 2020** with instructor permission. Late registration fees will apply for courses added after **Thursday, August 20, 2020**. The deadline for withdrawing from a course is **Friday, October 16, 2020**. Students may withdraw from the university (withdraw from all classes) through **Friday, December 4, 2020**.

## **Academic Misconduct**

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/>

## **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:

### **Main Campus**

Student Accessibility Services (SAS)  
Corbett Center Student Union Room 208  
Jesse Haas, Interim Director  
575-646-6840

[sas@nmsu.edu](mailto:sas@nmsu.edu)  
<http://sas.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 the Laura Castille, Executive Director, Title IX and Section 504 Coordinator, Office of Institutional Equity, P.O. Box 30001, E. 1130 University Avenue, Las Cruces, NM 88003; 575.646.3635; 575-646-7802 (TTY); [equity@nmsu.edu](mailto: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:

Laura Castille, Executive Director and Title IX Coordinator  
Office of Institutional Equity (OIE) - O'Loughlin House, 1130 University Avenue  
Phone: (575) 646-3635 E-mail: [equity@nmsu.edu](mailto:equity@nmsu.edu)  
Website: <http://equity.nmsu.edu/>

**Other NMSU Resources:**

NMSU Police Department:	(575) 646-3311	<a href="http://www.nmsupolice.com">www.nmsupolice.com</a>
NMSU Police Victim Services:	(575) 646-3424	
NMSU Counseling Center:	(575) 646-2731	
NMSU Dean of Students:	(575) 646-1722	
For Any On-campus Emergencies:	911	