

Professor: Dr. Justin B. Richardson

Office: Clark Hall 372 **Office Hours:** Fridays at 10-11 am and by appointment

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Class Location, Day, and Time:

<u>Lecture:</u> Clark Hall G004	Tuesday, Thursdays	9:30AM - 10:45AM
<u>Laboratory:</u> Cocke Hall 101	Wednesdays	3:00–6:00 PM
<u>Laboratory:</u> Gibson Hall 241	Thursday	3:30–6:30 PM

Course Description

Introduces the study of soils as a natural system. Topics include the fundamentals of soil chemistry, hydrology, and biology with respect to genesis, classification and utilization.

Prerequisites: EVSC 2800 and 3200; one year college chemistry or instructor permission.

Learning Objectives

- Provide students with the framework of soil materials with respect to geology, biology, chemistry, hydrology, edaphology, and land management.
- Master basic measurement of soil properties through hands on and field-based activities.

Textbook

“The Nature and Properties of Soils” 15th Edition, by Weil and Brady

ISBN-13: 978-0133254488

In addition, we will have readings from other textbooks and the scientific literature; these will be available via Canvas or distributed as physical copies. Readings should be done before class.

Canvas and UVA email

Check the course Canvas site regularly for updates to the syllabus, announcements, current news on the environment, assignment instructions etc. Students are expected to check their official UVA email addresses on a frequent and consistent basis to remain informed of University communications

Grading:

In-class quizzes	30%
In-class participation	10%
Laboratory reports	30%
Final Presentation	10%
Final Examination	20%
	100%

Letter grade	Min. score:	Letter grade	Min. score:
A+	97	C+	77
A	94	C	74
A-	90	C-	70
B+	87	D+	67
B	84	D	64
B-	80	D-	60

Letter grades will be based on the percentage of possible points earned.

Final course grades will be calculated using the following scale above. Student final scores of < 60.0% is a non-passing grade. There are no curve for grades.

Attendance

Students are expected to attend all class sessions. Instructors establish attendance and participation requirements for each of their courses. Class requirements, regardless of delivery mode, are not waived due to a student's absence from class. Instructors will require students to make up any missed coursework and may deny credit to any student whose absences are excessive. Instructors will keep an attendance record for each student enrolled in the course to document attendance and participation in the class.

Study Sheets

For each lecture, Dr. Richardson will provide a study sheet of all the important topics covered. Quiz questions will be derived directly from the study sheets.

Quizzes

Weekly quizzes will be on Canvas, covering materials from material covered during the current or previous week. Quizzes are intended to demonstrate application of newly acquired knowledge through examples using essential terminology, written answers, and computation.

University of Virginia Honor system

Honor Offense is defined as a Significant Act of Lying, Cheating or Stealing, which Act is committed with Knowledge. Three criteria determine whether or not an Honor Offense has occurred: **Act, Knowledge, Significance.**

A student should always conduct themselves honorably and students are formally bound by the Honor System in Charlottesville and Albemarle County, and elsewhere at any time when they identify as a University of Virginia student in order to gain the reliance and trust of others.

Please follow the Honor System guidelines described at <https://honor.virginia.edu/>

Generative Artificial Intelligence

A core objective of this class is for you to develop in using writing to organize your thoughts, and to think creatively and independently. Every student is expected to complete all assignments in this class, and especially writing assignments, without generative AI such as ChatGPT.

Students with Disabilities

Accessibility Statement: UVA is committed to creating a learning environment that meets the needs of its diverse student body. If you anticipate or experience any barriers to learning in this course, please feel welcome to discuss your concerns with your instructor. If you have a disability, or think you may have a disability, you should meet with the Student Disability Access Center (SDAC), to request an official accommodation. Their website is <https://www.studenthealth.virginia.edu/sdac>. If you have already been approved for accommodations through SDAC, please make sure to send your accommodation letter to me.

I encourage students with disabilities, including 'invisible' disabilities including chronic diseases and learning disabilities, to discuss appropriate accommodations. All discussions are confidential.

Equity, Inclusion, and Respect:

The UVa faculty and administration are committed to providing a safe and equitable classroom environment. The University prohibits discrimination, including sexual and gender-based harassment and violence, on the basis of sex, sexual orientation, gender, and gender identity or expression in all of its programs and activities, including academics, employment, athletics, and

other extracurricular activities. For more information, please see: <https://eocr.virginia.edu/title-ix>, where you can also find information about procedures for resolving prohibited conduct. Those who believe that they, or someone else, have been subjected to the above forms of conduct are encouraged to contact the Title IX office at (434)-297-7988 or titleixcoordinator@virginia.edu. You may also report prohibited conduct through "Just Report It" or by contacting the Title IX office to speak with a member of the Title IX staff. The Title IX Policy and Procedures are also available at <https://eocr.virginia.edu/title-ix>.

In accordance with UVa policies, faculty are required to report any information disclosed by students regarding alleged acts of prohibited conduct to the Title IX Coordinator. "Confidential Employees" are exempt from this requirement, and they include various licensed professionals who are not bound to disclose. You can find a listing of them here: <https://eocr.virginia.edu/chart-confidential-resources>.

Mental health

As a UVA student you have a number of resources to support your success in the classroom and your mental health and well-being. If you are feeling overwhelmed, stressed, or isolated, there are many individuals here to help. The Student Health and Wellness Center offers [Counseling and Psychological Services \(CAPS\)](#) for its students; call 434-243-5150 to speak with an on-call counselor and/or schedule an appointment. If you prefer to speak anonymously, you can call Madison House's [HELP Line](#) at any hour of any day: 434-295-TALK.

Religious Observances

I realize that some students may wish to take part in religious observances that fall during this academic term. Should you have a religious observance that conflicts with your participation in the course, please come speak with Dr. Richardson before the end of the second week of the term to discuss appropriate accommodations.

Student success

The goal of required readings, assignments, and exams are to ensure students learn the material. However, if you are falling behind due to difficulty in concepts, over commitment, or other personal reasons, please email Dr. Richardson. Whether it is finding a study partner or getting extra appointment time to go over material, your success as a student is my goal. However, I cannot fix poor exam grades after the fact. Be proactive!

Tentative Lecture Schedule

Week	Date	Day	# - Lecture	Readings ^{†,‡}
Week 1	Jan 18	Th	1-Introductions - Soils	Chapter 1
Week 2	Jan 23	Tue	2-Soil materials – Rocks and Minerals	Chapter 2
	Jan 25	Th	3-Soil materials – Texture, Color, and Aggregates	Chapter 4
Week 3	Jan 30	Tue	4-Soil materials – Parent materials & Pedogenesis	Chapter 2
	Feb 1	Th	5-Soil Taxonomy – Soil horizons	Chapter 2
Week 4	Feb 6	Tue	6-Soil Taxonomy – Diagnostic horizons	Chapter 3
	Feb 8	Th	7-Soil Taxonomy – Soil Orders	Chapter 3
Week 5	Feb 13	Tue	8-Soil water – Water and Air Energy	Chapter 5
	Feb 15	Th	9-Soil water – Darcy's Law and Infiltration	Chapter 5
Week 6	Feb 20	Tue	10-Soil water – Aeration and Redox	Chapter 7
	Feb 22	Th	11-Soil water – Wetlands and wet soils	Chapter 7.7
Week 7	Feb 27	Tue	12-Soil water – Applied hydrology	Chapter 6
	Feb 29	Th	13-Soil Chemistry – Pollution Transport	Chapter 5.5 and 18
Week 8	Mar 5		Spring Break!	
	Mar 7		Spring Break!	
Week 9	Mar 12	Tue	14-Soil Chemistry – Cation and Anion exchange	Chapter 8
	Mar 14	Th	15-Soil Chemistry – Clays and Organic matter	Chapter 8 and 12
Week 10	Mar 19	Tue	16-Soil Chemistry – Acid and Saline soils	Chapter 9 and 10
	Mar 21	Th	17-Soil Biology – Macrofauna (fur, worms, bugs)	Chapter 11
Week 11	Mar 26	Tue	18-Soil Biology – Fungi	
	Mar 28	Th	19-Soil Biology – Bacteria	
Week 12	Apr 2	Tue	20-Soil Biology - Rhizosphere	
	Apr 4	Th	21-Plant Growth – Modern Ag systems	
Week 13	Apr 9	Tue	22-Plant Growth – Nitrogen and Sulfur	Chapter 13
	Apr 11	Th	23-Plant Growth – P, K, Ca, Mg, micronutrients	Chapters 14 and 15
Week 14	Apr 16	Tue	24-Plant Growth – Soil Amendments	
	Apr 18	Th	25-Soil Management – Soil Mapping	WebSoilSurvey – chapter 19
Week 15	Apr 23	Tue	26-Soil Management – Soil Mapping	Chapter 16
	Apr 25	Th	27-Soil Management – Erosion and RUSLE	Chapter 17
Week 16	Apr 30	Tue	28-Soil Management – Pollution transport	
	May 3rd		Final Exam due	

[†]Chapters listed are from Brady and Weil “The Nature and Properties of Soils” 15th edition

[‡]Supplemental readings from scientific papers will be uploaded to Canvas

Tentative Laboratory Schedule

Week	Date	Laboratory/Field Activity	Activity
Week 2	Jan 24/25	Geology of Eastern United States	Maps and rocks
Week 3	Jan 31/Feb 1	Soil texture, color, aggregates	Texture, color, peds
Week 4	Feb 7/8	Soil horizons and Redox set up	Soil profile descriptions
Week 5	Feb 14/15	Soil infiltration and saturated conductivity	Ksat and Infiltration
Week 6	Feb 21/22	Soil Oxidation-Reduction Ladder	Soil Redox and ORP
Week 7	Feb 28/Mar1	Wetlands and hydrologic saturation	Walking tour of wet-dry areas
Week 8	Mar 6/7	No Lab this week	
Week 9	Mar 13/14	Cation exchange experiment	Cation capture
Week 10	Mar 20/21	Soil fauna identification Set up plant growth set up	Soil fauna extraction
Week 11	Mar 27/28	Farm tour and measurements	Morven
Week 12	Apr 3/4	Soil Mapping (start Farm and Country report and presentations)	WebSoilSurvey (bring laptop)
Week 13	Apr 10/11	Continue working on final presentations	
Week 14	Apr 17/18	Continue working on final presentations	
Week 15	Apr 24/25	Farm and Country Presentations and Report due	

For indoor laboratory experiments:

- Wear closed-toed shoes, pants that cover legs, and expect clothes to become dirty.
- You will be touching soil, plants, and soil fauna.
- Bring water as the laboratory periods can be up to 3 hours long.

What to bring for tours:

- Bring water, backpack, clipboard
- Wear boots, coat, hat as it can be chilly.
- If you have work gloves, bring them.

What to expect for Field Trips

- There is a strong chance you'll get muddy/dirty, so bring field clothes. Expect clothes to be stained
- Field trips will aim to be completed by in 1.5 hours

** If weather on is poor/rainy, laboratory activities may be switched.