



SWS 5050 — Soils for Environmental Professionals

Instructor	Ebrahim Babaeian, Ph.D. Email: ebabaeian@ufl.edu Office: McCarty Hall A, Room G151 / (352)294-3106 Office Hours: Please email me to set up an appointment.
Teaching Assistant	Karun Katoch Email: karunkatoch@ufl.edu
Credit Hours	3 Credits <u>Prerequisites</u> : Good knowledge of chemistry. Graduate Student status or instructor approval.
Delivery Mode	<u>Online</u>
Communication & Course Meeting Times:	We use CANVAS to communicate, share resources and post grades. Lectures are pre-recorded and posted on Canvas in an Asynchronous format. Students can access the recorded lectures via Canvas at any time throughout the semester. Live chat sessions are held weekly for 1 hour and take place via Zoom through Canvas and scheduled for Tuesdays from 6:30-7:30 pm ET . An internet connection, video camera, microphone, and speaker are required. Chat topics and questions are listed under the “Chat” tab on main banner on class website. You may participate by typing or using a microphone/webcam. All chats are recorded and posted on Zoom conferences/ Cloud Recordings. We will be using the same Zoom Meeting URL for all chat sessions. You can access call in information in Canvas under Zoom conferences.
Course Description	The course is an introductory class in soil science intended for graduate students and professionals in the environmental science area with little or no background in soil science. The course will describe soil physical, chemical and biological properties and processes that determine the fundamental role soils play in the environment.
Course Objectives	- To gain an overall understanding of the soil physical, chemical and biological properties that impact plant growth and the environment. - To recognize the different soil processes that occur in soils whether it is related to water retention, cation exchange capacity or adsorption. - To gain a general understanding of nutrient cycles.
Learning Outcomes	After completing this course, students are able to: - Discuss the importance of soil physical properties (soil texture, structure, bulk density and aggregation) on the function of soils. - Classify and categorize the different soil orders according to their horizons and physical and chemical properties and their suitability of use in various cropping systems. - Debate differences in water holding capacity in various soils and solve for water content.



- Discuss the differences in cation exchange capacity (CEC) and adsorption in various soils and solve for CEC problems.
- Identify the essential elements (N & P), their functions in the plant and deficiency symptoms.
- Discuss the environmental impacts and Best Management Practices for N & P.
- Debate the management practices of acid, salt-affected and anaerobic soils and solve for liming problems.

Course Readings

The course materials are provided through the course webpage (Canvas) (UF E-Learning Portal: <https://elearning.ufl.edu/>: Log in to E-Learning with your username & password.

- **PowerPoint Slides:** Pre-recorded lectures (developed by Dr. Samira Daroub).
- **Textbook:** “The Nature and Properties of Soils” by Ray R. Weil and Nyle C. Brady, 2017 15th edition. ISBN13: 978-0133254488. The 14th Edition, published by Prentice-Hall, Inc. in 2007 (ISBN13: 9780132279383) is okay to use. **You may order the book from UF bookstore OR on -2- line at <https://www.pearsonhighered.com/>.**
- You may borrow a physical copy from the UF Library.
- Additional reading materials will be posted on class website.

Students’ Responsibilities

Students are expected to study the assigned text chapters and lectures prior to lecture coverage during chat time. Students are expected to actively participate in class chat discussions. Chat questions are posted for every week under the “Chat” tab. Please come prepared to discuss the posted questions, you can also bring in your questions to discuss if time allows. In addition, we have graded discussions that are posted on class website.

Homework (HW), Discussions, Exam

There will be ~3 lecture exams, 7 HW and 4 discussions. Exams are administered online. Please note due dates for HW and discussions and submit on-time using the Assignment or the Discussions tab. HW drop box remains open for 48 hours after due date for a 5% penalty in grade. Your final grade will be based on the cumulative score for the 3 lecture exams, homework assignments and participation in chat sessions and discussions. Please do not email HW or discussions- these will not be accepted.

Grades and Grade Points

The evaluation and final grades will be based on:

Assessment Type	Qty	Points	Final Grade
Exams	3	100 Pts each	300 pts
Homework Assignments (HW)	7	15, 15, 25, 25, 20, 10, 20 pts each	130 Pts
Discussions	4	20 Pts each	80 Pts
Total			510 Pts

≥ 460	A	≥ 380	C+
≥ 450	A-	≥ 360	C
≥ 435	B+	≥ 335	C-
≥ 415	B	≥ 315	D+
≥ 395	B-	≥ 300	D



For information on current UF policies for assigning grade points, see:

<https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

**Use of AI Tools
(e.g., ChatGPT)**

Because this course requires the learning of soil science fundamentals and that several topics cover material that may need to be completed in real world environments after completion of the course, the use of AI and other computer-based programs is strictly prohibited. Use of AI will be treated as cheating and disciplinary action will be handled in accordance with the University's policies and rules.

Netiquette:

https://www.cise.ufl.edu/wp-content/uploads/2019/08/CISE_Netiquette_Guide.pdf

Student Privacy

There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information, please see:

<https://registrar.ufl.edu/ferpa.html>

**Attendance &
Make-Up Work**

For participation, the requirements are consistent with the university policies:

Make-up exams are only authorized by instructor and must be justified and authenticated. See UF policies at:

<https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>

**Special Needs &
Accommodations
Statement**

Students who need special accommodation or services should contact the **Disability Resource Center**, 1316 Museum Rd, Gainesville, FL 32611, (352) 392-8565, FAX (352) 392-8570, email: DRC@ufsa.ufl.edu; accommodations@ufsa.ufl.edu, <https://disability.ufl.edu/students/accommodations/>. You must register and request that the Center or DRC send me official notification of your accommodations needs as soon as possible. Please plan to meet with me by appointment or during office hours to discuss accommodations and how my course requirements and activities may impact your ability to fully participate. **The need for accommodation must be documented by the appropriate office.**

**Confidentiality of
Student Records**

The University of Florida is committed to providing services and support to meet your needs and achieve your educational goals. We are equally committed to protecting your privacy. For information regarding the confidentiality of student records please visit:

<https://catalog.ufl.edu/UGRD/academic-regulations/ferpa-confidentiality-student-records/>

**Copyright for
Instructional
Materials &
Software Use**

The materials used in this course are subject to copyright protection and are only for the use of students officially enrolled in this course for the educational purposes associated with the course. Copyright law must be considered before copying, retaining, or disseminating materials outside of the course.

All faculty, staff and students at the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against university policies and rules, disciplinary action will be taken as appropriate. UF copyright information policies:



<https://security.ufl.edu/resources/copyright-information/>

University Honesty Policy

Students at University of Florida are bound by The Honor Pledge which states, “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.”

The Honor Code: (<https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

Diversity Statement

The Soil and Water Sciences Department is committed to diversity and inclusion of all students. We acknowledge, respect, and value the diverse nature, background and perspective of students and believe that it furthers academic achievements. It is our intent to present materials and activities that are respectful of diversity: race, color, creed, gender, gender identity, sexual orientation, age, religious status, national origin, ethnicity, disability, socioeconomic status, and any other distinguishing qualities.

Course Evaluation

At the end of the semester, students are expected to provide feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at <https://gatorevals.ua.ufl.edu/students/>. Students will be notified when the evaluation period opens. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/results>.

Campus Helping Resources

On-campus resources are available to students who are experiencing difficulties or who lack clear career and academic goals:

Health and Wellness:

- **Counseling and Wellness Center:** <http://www.counseling.ufl.edu/cwc> and 392-1575.
- **Sexual Discrimination, Harassment, Assault, or Violence:** If you or a friend has been subjected to sexual discrimination, sexual harassment, sexual assault, or violence contact the Office of Title IX Compliance, located at Yon Hall Room 427, 1908 Stadium Road, (352) 273-1094, title-ix@ufl.edu
- **Sexual Assault Recovery Services (SARS):** Student Health Care Center, 392-1161.
- **University Police Department:** at 392-1111 or 9-1-1 for emergencies, or <http://www.police.ufl.edu/>

Academic Resources:

- **E-learning technical support:** 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu. <https://lss.at.ufl.edu/help.shtml>, <http://lss.at.ufl.edu>.
- **Teaching Center:** Broward Hall, 392-2010 or 392-6420. General study skills and tutoring. <https://teachingcenter.ufl.edu/>.
- **Career Resource Center:** Reitz Union, 392-1601. Career assistance and counseling. <https://www.crc.ufl.edu/>.



- **Student Complaints Campus:** https://www.dso.ufl.edu/documents/UF_Complaints_policy.pdf.
- **Library Support:** <http://cms.uflib.ufl.edu/ask>. Various ways to receive assistance with respect to using the libraries or finding resources.
- **Writing Studio:** 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers. <https://writing.ufl.edu/writing-studio/>.
- **On-Line Students Complaints:** <http://www.distance.ufl.edu/student-complaint-process>



Course Topics & Schedule

* This schedule is tentative and subject to changes.

Chat sessions are on Tuesdays from 6:30-7:30 pm ET. The due date of HW is provided in the Table with 24 h grace period for a 5% penalty in grade (unless otherwise indicated). Discussions' due dates are provided in the Table. Exams are open Tuesdays @ 6:00 am thru Tuesday @ 11:59pm ET.

Week	Module #	Chat Date	Assessment	Due Date
Week 1	Module 1 - Introduction to Soils - Read in the textbook Chapter 1: The Soils around us - Review of Chemical Principles Handout	Welcome Chat 13 Jan	Discussion: Introduction HW 1: Chemical Review	16 Jan. 17 Jan. (11:59 PM ET)
Week 2	Module 2 - Soil Physical Properties Read Chapter 4: Soil Physical Properties	Chat 1 20 Jan	HW 2: Texture & Bulk Density	24 Jan. (11:59 PM ET)
Week 3	Module 3: Soil Formation Read Chapter 2: Formation of Soils from Parent Materials	Chat 2 27 Jan		
Week 4	Module 4: Soil Classification Read Chapter 3: Soil Classification	Chat 3 3 Feb.	HW 3: Soil Classification	7 Feb. (11:59 PM ET)
Week 5	Exam 1: Modules 1 to 4 Feb 10, 2026	No Chat 10 Feb.		
Week 6	Module 5: Soil Water Read Chapter 5: Soil Water	Chat 4 17 Feb.	HW 4: Soil Water	21 Feb. (11:59 PM ET)
Week 7	Module 6: Soil Colloids and Ion Exchange Read Chapter 8: Soil Colloids	Chat 5 24 Feb.	HW 5: Soil Colloid and CEC	28 Feb. (11:59 PM ET)
Week 8	Study Guides on cation exchange capacity (CEC): Download Practice Problems and Tutorial on CEC	Chat 6 3 Mar.	HW 6	7 Mar. (11:59 PM ET)
Week 9	Module 7: Soil Organic Matter Read Chapter 12; Soil organic Matter	Chat 7 10 Mar.	Discussion 1 SOM	14 Mar. (11:59 PM ET)
Week 10	Spring Break 16 – 20 March 2026			
Week 11	Module 8: Nitrogen Read Chapter 13: Soil Nitrogen	Chat 8 24 Mar.	Discussion 2 Nitrogen BMPs	28 Mar. (11:59 PM ET)
Week 12	Exam 2: Modules 5 to 8 March 31, 2026	No Chat 31 Mar.		
Week 13	Module 9: Phosphorus Read Chapter 14: Soil Phosphorus	Chat 9 7 Apr.	Discussion 3 Phosphorus BMPs	11 Apr. (11:59 PM ET)
Week 14	Module 10: Acid Soils - Read Chapter 9: Soil Acidity	Chat 10 14 Apr.	HW 7: Acid soils and liming calculations	18 Apr. (11:59 PM ET)



	- Download liming calculations example handout - Download practice problems on pH, CEC, and liming handout			
Week 15	Module 11: Alkaline and Salt Affected Soils Read Chapter 10: Soils of Dry Regions: Alkalinity, Salinity & Solidity	<u>Chat 11</u> 21 Apr.	Discussion 4 <i>Salt affected soils</i>	25 Apr. (11:59 PM ET)
	Classes end Wed. April 22 Reading days: 23 - 24 April			
	<u>Exam 3: Modules 9 to 11</u> Available April 28, 2026			