Syllabus – Fall 2025

SWS 5132 – Tropical Soils Management

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Partners (Brazil)
Dr. **Pavinato** (University of São Paulo – **Soil Fertility**)
Dr. **Guilherme** (Federal Univ. of Lavras – **Soils and Food Security**)
Dr. **Mattiello** (Federal Univ. of Vicosa – **Plant nutrition**)

Course Structure
Credit-hours: 3
Format: In-person and Online (Via Zoom)
Lectures:
Where: All classes will be via Zoom
When: Thursdays 12:50-2:45 PM with a 15-minute break and Tuesdays 6:15-7:05 PM

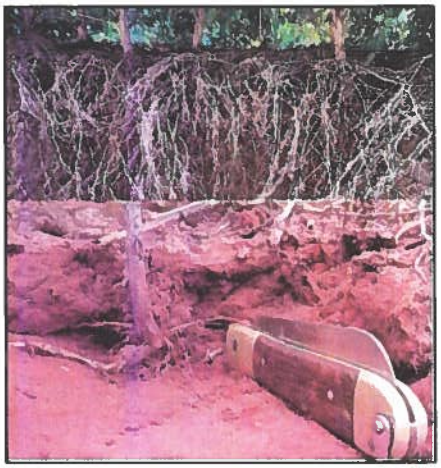
Day/location is tentative and subject to change.

Office hours After class and by appointment

Course Prerequisite
SWS 3022: Introduction to Soils in the Environment **or**
SWS 5716C: Environmental Pedology **or**
SWS 5050: Soils for the Environmental Professionals **or**
Equivalent courses from other universities **or**
Permission from the instructor

Course Requirements UF Students must have a UF e-mail account and access to internet and a computer that meets the University of Florida computer standards.

Course Description
How can we improve food production within the tropics without depleting our fragile soil and natural resources? In the course Tropical Soils Management (SWS 5132), we work around that question. The course is designed for students interested in the principles of management of soils under tropical environments. The *overall goal* is to *provide students with a deep understanding of the diversity and variability of tropical soils and their agronomic and ecological practical applications*. First, we focus on basic aspects of tropical soils such as their functions in society, taxonomy classification, mineralogy, physical and biological properties, and soil fertility principles. After, we work on management strategies to overcome their main constraints and improve food production while mitigating the degradation of processes and functions of those soils (*e.g.*, acidification, compaction, and erosion). We emphasize principles of sustainable agriculture, soil health, and circular economy. Overall,



the students obtain skills applicable to agriculture, soil science, agronomy, environmental science, and other related disciplines. By the end of the program, the students will be able to decide on management strategies to improve food production while decreasing the agricultural footprint in the tropics.

Course Objectives

1. To gain knowledge of the diversity and variability of culture, people, and problems faced in the tropics.
2. To gain knowledge of the diversity and variability of soils in the tropics, *e.g.*, physical, chemical, and mineralogical properties.
3. To learn strategies to improve and/or sustain soil functions under tropical conditions.
4. To learn concepts and principles of sustainable agriculture applicable to tropical soils and their implication on global challenges.
5. To learn, discuss, and implement sustainable management practices for tropical environments.

Course Readings

Required:
Provided PowerPoint slides.
Recommended:
Course textbook. Although not required, it is quite important to read the chapters of the course textbook.
Additional:
Research articles and/or book chapters will be provided.

Course textbook

Sanchez P.A. 2019. Properties and Management of Soils in the Tropics, Second edition. Cambridge University Press, Cambridge, UK. https://doi.org/10.1017/9781316809785 ISBN: 9781107176058 (print), 9781316809785 (e-version).
All reading assignments will be available on the course website https://elearning.ufl.edu/

Course Schedule

The schedule is **approximate**; pace may vary. The second period is for general discussion, or if no questions, will proceed with the next topic.

Week # (W) Date	**Session/Major Topics Lecture Topics**	**Recommended Readings** Chapters from the textbook (above), lecture slides, and additional readings when specified.	**Assignments**
Part I:	**The Tropical Environment**		
W1-W2 Aug 21 (Th) Aug 26 (T)	1. Course Introduction 2. The Natural Tropical Environment 3. The Human Environment of the Tropics	Syllabus & Canvas instructions Chapter 1 & Lecture 1 Chapter 2 & Lecture 2	**A1** handed out
Part II:	**Pedology, Physics, Chemistry, Biology**		
W2 Aug-28 (Th)	Soils of the Tropics	Chapters 3 & 4; Lecture 3/4	**A2** handed out A1 is due
W3 Sept-2 (T) Sept-4 (Th)	Functional Capability Classification System Soil Mineralogy	Chapter 5; Lecture 5 Chapter 8; Lecture 8	**A3** handed out A2 is due
W4 Sept-9 (T) Sept-11 (Th)	Soil Physics and Water	Chapter 6; Lecture 6;	**A4** handed out A3 is due
W5 Sept-16 (T) Sept-18 (Th)	Soil Acidity	Chapter 9 & Lecture 9 Moraes et al., 2023. https://doi.org/10.1016/j.eja.2023.126763	**A5** handed out A4 is due
W6		Chapter 10 & Lecture 10	**A5** handed out

Sept-23 (T) Sept-25 (Th)	Soil Biology		A4 is due
W7 Sept-30 (T) Oct-2 (Th	Organic Carbon	Chapter 11	***Exam 1*** handed out
Part III:	**Soil Fertility**		
W8 Oct-7 (T) Oct-9 (Th)	Fertility Principles Management of N, P, K, S, and Micronutrients in the tropics	Chapters 12, 13, 14 & 15 Lectures 12-15: Soil Fertility Principles and Key Nutrients in the Tropics	*Exam 1* is due
W9 Oct-14 (T) Oct-16 (Th)	Nitrogen & Phosphorus in Florida Nitrogen Phosphorus Sulfur and micronutrients	Lecture: Nitrogen & Phosphorus Management in Florida Lecture: Phosphorus Management in Brazil Lecture: Nitrogen Management in Brazil Lecture: Sulfur Management in Brazil	**A5** handed out A4 is due
Part IV:	**Soil Health**		
W10 Oct-21 (T) Oct-23 (Th)	Soil Health	Lecture: Concept and Assessment Lecture: Soil Health in the Tropics	**A6** handed out A5 is due
W11 Oct-28 (T) Oct-30 (Th)	Soil and Human Health Connection Biofortification	Lecture: Soil Health-Human Health Nexus Lecture: Biofortification as a strategy to mitigate hunger in the tropics	**A7** handed out A6 is due
Part V:	**Management Strategies**		
W12 Nov-4 (T) Nov-6 (Th)	Integrated Crop-Livestock Systems Forestry and Agroforestry	Lecture: Integrated Crop-Livestock Systems Lecture: Forestry and Agroforestry	**A7** handed out A6 is due
W13 Nov-13 (Th)	Circular Agriculture	Lectures: Conservation Agriculture	**A7** handed out A6 is due
W14 Nov-18 (T) Nov-20 (Th)	SMART Fertilizer The Brazilian example	Lecture: SMART Fertilizer Lecture: Tropical agriculture: the Brazilian example	**Due A#6 (Apr-9)**
W15 Nov 24-29	Holliday		
W16 Dec 1-5	Reading	Reading days	Take-home exam 2 handed out
Dec-11	Final		Take home exam 2 due (Nov 11)

Course Assessment and Grading

Student learning is assessed based on 2 take-home exams (open book, closed mouth), a short paper organized as a Science Policy Forum article (< 1500 words, with abstract text, references and 2 tables or figures), plus class participation.

Assignments turned in late result in a loss of 5 points per day of the maximum points unless late turn-in is caused by excused absences.

Assignment	**Percentage of Final Grade**
Take home exam 1	25
Take home exam 2	25
Assignments	20
Seminars	20
Class participation	10
Total	100%

Percent	Grade
93.0-100	A
90.0-92.9	A-
88-89.9	B+
83-87.9	B
80-82.9	B-
78-79.9	C+
73-77.9	C
70-72.9	C-
60-69.9	D
<60	E

For information on current UF policies for assigning grade points, see **https://catalog.ufl.edu/ugrad/ /regulations/info/grades.aspx**

Attendance and Make-Up Work

On-campus or virtual attendance for the 28 class periods is mandatory unless excused according to university policy.

Requirements for class attendance and make-up exams, assignments, and other work are consistent with university policies that can be found at:
https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx.

Students Requiring Accommodations

Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, https://www.dso.ufl.edu/drc) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

Course Evaluation

Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at https://evaluations.ufl.edu/evals. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at https://evaluations.ufl.edu/results/.

University Honesty Policy

UF students 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.

Software Use
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. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

Student Privacy
There are federal laws protecting your privacy about grades earned in courses and on individual assignments. For more information, please see: http://registrar.ufl.edu/catalog0910/policies/regulationferpa.html

Campus Resources:

Health and Wellness

U Matter, We Care:
If you or a friend is in distress, please contact umatter@ufl.edu or 352 392-1575 so that a team member can reach out to the student.

Counseling and Wellness Center: http://www.counseling.ufl.edu/cwc, and 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

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.

Career Resource Center, Reitz Union, 392-1601. Career assistance and counseling. https://www.crc.ufl.edu/.

Library Support, http://cms.uflib.ufl.edu/ask. Various ways to receive assistance with respect to using the libraries or finding resources.

Teaching Center, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring. https://teachingcenter.ufl.edu/.

Writing Studio, 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers. https://writing.ufl.edu/writing-studio/.

Student Complaints Campus: https://www.dso.ufl.edu/documents/UF_Complaints_policy.pdf.