SWS 5115

Environmental Nutrient Management

INSTRUCTOR: Dr. Samira Daroub

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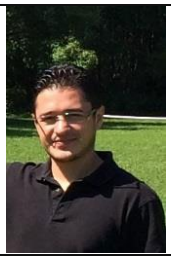

COURSE DESCRIPTION: SWS 5115

The prerequisite for this course is SWS 3022 or SWS 5050. In this course chemical properties of plant nutrient sources will be discussed to familiarize students with materials use and their status as a non-renewal natural resource. Methods and rates of application, effects on soil reactions, plant requirements and their environmental effects on the soil and water ecosystem are discussed to identify impacts of specific plant nutrient sources.

COURSE GOALS

1. To understand the chemistry of essential elements in the soil in relation to their functions in plant nutrition
2. To learn about the different types of fertilizers, when and how to use appropriately.
3. To recognize the impact of conventional agriculture including use of fertilizer and amendments on water and air quality and identify best management practices (BMPs)

COURSE LEARNING OBJECTIVES:

Students in this class will be able to:

1. Identify the essential elements, their functions in the plant and deficiency symptoms
2. Classify and categorize the different sources of fertilizer materials and discuss their chemical properties as they relate to their utilization and environmental impact.
3. Discuss the chemical reactions of plant nutrient sources with the soil and the environmental fate of the nutritional elements whether it be loss by leaching, plant uptake, fixation or soil retention.

4. Debate nutrient management practices which minimize environmental impacts of fertilizers and conventional agriculture
5. Compare practices used in organic farming and sustainable agriculture

TEXTBOOK AND READINGS

Students are required to purchase the following text book *Soil Fertility and Fertilizers, 8*th edition. Published in 2014 by Havlin, Beaton, Tisdale and Nelson. ISBN-13: 978-0-13-503373-9

COURSE FORMAT AND DELIVERY METHOD

Class is Internet-based with discussion board, chat room and e-mail support. The course will be offered in independently graded modules on a timed basis. All students will progress through the course together, taking exams as they complete each module.
Course website is located at http://elearning.ufl.edu/. Login into Canvas using your Gatorlink username and password. If you are registered for the course, you will see it listed under E-learning. Students must login to class website within the first 2 weeks of class. Out-of-state students should consult the UF Soil and Water Science Department Web site for current tuition information http://soils.ifas.ufl.edu/distance/

ONLINE MEETINGS /CHAT SESSIONS: Thursdays 6-7:30 pm using zoom. The URL for all chat meetings throughout the Fall 2020 semester is published on class website.
Our class sessions are audio visually recorded for students in the class to refer back and for enrolled students who are unable to attend live. Students who participate with their camera engaged or utilize a profile image are agreeing to have their video or image recorded. If you are unwilling to consent to have your profile or video image recorded, be sure to keep your camera off and do not use a profile image. Likewise, students who un-mute during class and participate orally are agreeing to have their voices recorded. If you are not willing to consent to have your voice recorded during class, you will need to keep your mute button activated and communicate exclusively using the "chat" feature, which allows students to type questions and comments live. The chat will not be recorded or shared. As in all courses, unauthorized recording and unauthorized sharing of recorded materials is prohibited

GRADES AND GRADE POINTS

	Points		A	≥ 500 pts	C	≥ 396
Module I Exam	110		A-	≥ 484	D+	≥ 374
Module II Exam	100		B+	≥ 468	D	≥ 340
Module III Exam	100		B	≥ 445	E	<340
7 Problem Sets	120		C+	≥ 429		
6 Discussions	120					
Total	**550**					

In addition, there will be three bonus discussions for a total of 18 points added to the 550 points that you can earn. For information on current UF policies for assigning grade points, see https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx

Attendance and Make-Up Work
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

Online Course Evaluation Process

Student assessment of instruction is an important part of efforts to improve teaching and learning. Students are expected to provide professional and respectful 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.aa.ufl.edu/students/. Students will be notified when the evaluation opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via https://ufl.bluera.com/ufl/. Summaries of course evaluation results are available to students at https://gatorevals.aa.ufl.edu/public-results/.

Academic Honesty

As a student at the University of Florida, you have committed yourself to uphold the Honor Code, which includes the following pledge: *"We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity* by abiding by the Honor Code. You are expected to exhibit behavior consistent with this commitment to the UF academic community, and on all work submitted for credit 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*."

It is assumed that you will complete all work independently in each course unless the instructor provides explicit permission for you to collaborate on course tasks (e.g. assignments, papers, quizzes, exams). Furthermore, as part of your obligation to uphold the Honor Code, you should report any condition that facilitates academic misconduct to appropriate personnel. It is your individual responsibility to know and comply with all university policies and procedures regarding academic integrity and the Student Honor Code. Violations of the Honor Code at the University of Florida will not be tolerated. Violations will be reported to the Dean of Students Office for consideration of disciplinary action. For more information regarding the Student Honor Code, please see: http://www.dso.ufl.edu/sccr/process/student-conduct-honor-code.

Software Use:

All faculty, staff and students of 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.

Services for Students with Disabilities

The Disability Resource Center coordinates the needed accommodations of students with disabilities. This includes registering disabilities, recommending academic accommodations within the classroom, accessing special adaptive computer equipment, providing interpretation services and mediating faculty-student disability related issues. Students requesting classroom accommodation must first

register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student who must then provide this documentation to the Instructor when requesting accommodation. 0001 Reid Hall, 352-392-8565, **www.dso.ufl.edu/drc/**

Campus Resources

Students experiencing crises or personal problems that interfere with their general well-being are encouraged to utilize the university's counseling resources. The Counseling & Wellness Center provides confidential counseling services at no cost for currently enrolled students. Resources are available on campus for students having personal problems or lacking clear career or academic goals, which interfere with their academic performance.

1. *University Counseling & Wellness Center, 3190 Radio Road, 352-392-1575,* **www.counseling.ufl.edu/cwc/**
2. U Matter We Care, **www.umatter.ufl.edu/** *U Matter, We Care*: If you or someone you know is in distress, please contact umatter@ufl.edu, 352-392-1575, or visit U Matter, We Care website to refer or report a concern and a team member will reach out to the student in distress.
3. *Career Resource Center,* First Floor JWRU, 392-1601, https://career.ufl.edu/

Student Complaints:

Residential Course: https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/

Online Course: Each online distance learning program has a process for, and will make every attempt to resolve, student complaints within its academic and administrative departments at the program level. See : http://www.distance.ufl.edu/student-complaint-process for more details.

DATES

Events	**Fall 2020**
Classes Begin	August 31
Classes End	December 9
Reading Days	December 10-11
Holidays - no classes	Sept. 7, Labor Day Nov. 11, Veterans Day Nov. 25-27, Thanksgiving Holiday

PROFESSIONAL SOCIETY MEETINGS OF INTEREST:

Soil Science Society of America meetings https://soils.org/	November 9-13

Tentative Schedule Fall 2020

HW are due on Sundays with 24 h grace period (5% penalty on grade); Discussions are due on Sundays; Chats are every Thursday unless otherwise noted

(Chat dates, and due dates of HW and Discussions are updated on Canvas under Syllabus tab and Calendar)

Week	Lecture Topic	Dates
1 Aug 31	**Introduction & Calculations Review** Introduction; Fertilizer Labeling; chemistry and soil science calculations review ***Read:*** 1. Textbook, Chapter 1 Introduction 2. Edis Pub SS17000: The Florida Fertilizer Label 3. Review of chemical principles • *HW 1- Calculations review* • *Discussion 1: Introduce yourself*	Discussion1: Due Sept 6 HW1-Due Sep 13
2 Sept 8	**Nitrogen Cycle** N-Cycle and Inorganic Sources of N ***Read:*** 1. Textbook, Chapter 4 Nitrogen	**Chat 1: Sept. 10** Introductions and questions on HW 1
3 Sept 14	Nitrification, Slow release fertilizers & Fertilizer Rate Calculations Read: 1. Review pages 145-156 in Chapter 4 2. EDIS pub Selected fertilizers, Sartain and Kruse 3. Handout on Nitrification inhibitors for corn production 4. Study guide on fertilizer rate calculations; *HW 2- Fertilizer rates*	Chat 2- Sept. 17 HW2 -Due Sep 27
4 Sept 21	Organic N and mineralization ***Read:*** 1. Review pages 136-144 and 178-183 in Chapter 4 2. Chapter 10 Textbook- Nutrient Management (focus on pages 409-420) 3. Chapter 12, Textbook -Agricultural Productivity and Environmental Quality (focus on pages 451-462)	Chat 3 – Sept .24 Discussion 2: Due Oct. 4
5 Sept 28	**Environmental Issues with Nitrogen** N-BMPs and TMDLs ***Read:*** 1. Textbook, Chapter 12 -Agricultural Productivity and Environmental Quality (Focus on pp 476-501) • *Discussion 3: N BMPs*	Chat 4- Oct 1 Discussion 3- Due *Oct. 18 (after exam 1)*
6 Oct 5	**BMPs and Denitrification** 1. Reading materials for HW 3 posted on website • *HW 3- BMPS and Denitrification*	Chat 5 - Oct 8 Exam questions HW3-Due Oct. 18 (*after exam 1)*
	EXAM 1 (lectures weeks 1-6): Exam available on-line	Oct 9-12
7 Oct 12	**Phosphorus** Role of P in plant nutrition; Soil phosphorus reactions ***Read:*** 1. Textbook, Chapter 5 pp. 185-208	*No Chat Oct 15*

	2. Several papers on P posted	
8 Oct 19	P fertilizers and reaction in soils; Factors affecting P availability. Read Textbook, Chapter 5 pp. 208-220 • *HW 4 Fertilizer formulations*	Chat 6 Oct. 22 HW 4 – Due Nov 1
9 Oct 26	**Environmental Issues with Phosphorus** P and Environmental Quality; Soil test P Read: 1. Textbook, Chapter 9 - soil test P pp. 332-347 2. Discussion 4: BMPs for P	Chat 7 Oct. 29 Discussion 4 Due Nov. 8
10 Nov. 2	**Potassium & Soil Fertility Evaluation** Functions, soil sources and materials Read: **1.** Textbook, Chapter 6 Potassium **2.** Textbook, Chapter 9 Soil fertility evaluation • *HW 5: K and soil testing*	Chat 8 Nov. 5 HW 5: Due Nov 8
11 Nov. 9	Reactions of K fertilizers with soil Guest Lecture- Turf grass nutrition; ***Bonus Discussion***	Exam review Chat 9 Nov 12 Bonus Discussion 1- Due Nov. 22
	EXAM II (lectures week 7-11): Exam available on-line	Nov. 14-16
12 Nov 16	**Soil Acidity and Liming; Ca, Mg, and Sulfur** Sources, forms, and reactions of Ca, Mg and S Environmental issues with sulfur. Read: 1. Textbook, Chapter 3 Soil Acidity and Alkalinity pgs 49-92 2. Textbook, Chapter 7 *3.* Two Articles on Sulfur (posted under supplemental readings) • *HW 6 pH, CEC and Liming* • *HW 7 Sulfur*	*Chat 10 Nov. 19* HW 6 Due Nov. 22 HW 7 Due Dec. 6
13 Nov 23	**Organic Farming and sustainable agriculture** • Discussion 6: Organic vs conventional farming	Discussion 5 due Dec. 6
14 Nov 30	Guest lecture – Palm nutrition Catch up on class materials	*No Chat Nov. 26* Thanksgiving Bonus Discussion 2 due Dec. 6
15 Dec 7	**Micronutrients and Trace Elements** General Cycle and reactions of micronutrients; Micronutrient fertilizers. Environmental issues with trace elements Read: 1. Textbook, Chapter 8 2. G. Pierzynski, J. Sims, and G. Vance. Soils and Environmental Quality Chapter 7. Trace elements pages 245-272	Chat 11 Dec. 3 *Last chat!* Discussion 6 trace elements –Due Dec.9 (Wed)
	Last day of classes Wed Dec 9; Reading Days: Dec 10-11 Bonus Discussion 2- Class topics	Bonus Discussion 3– Due Dec 9 Wed)
	EXAM III (include lectures weeks 12-15) Available Dates	Dec 9 & Dec 12-13