SWS 5115

Environmental Nutrient Management

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Teaching Assistant	TBA

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 Adobe Connect. The URL for all chat meetings throughout the Fall 2016 semester is **http://mbreeze.ifas.ufl.edu/r15tsj20e0h/**
Adobe has a guide for participants that includes a link to their Connect Test page that will check your computer for required plug-ins and connection speed. The guide is at:
http://www.adobe.com/content/dam/Adobe/en/products/adobeconnect/pdfs/VQS_Guide_for_Participants.pdf (Links to an external site.)

GRADES AND GRADE POINTS

	Points
Module I Exam	110
Module II Exam	100
Module III Exam	100
6 Problem Sets	120
6 Discussions	120
Total	**550**

A	> 500 pts	C	= 396
A-	> 484	D+	= 374
B+	> 468	D	= 340
B	> 445	E	<340
C+	> 429		

In addition, there will be two bonus discussions for a total of 30 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. At the end of the semester, students are expected to provide feedback on the quality of instruction in

this course using a standard set of university and college criteria. These evaluations are conducted online at https://evaluations.ufl.edu. Evaluations are typically open for students to complete during the last two or three weeks of the semester; students will be notified of the specific times when they are open. Summary results of these assessments are available to students at https://evaluations.ufl.edu/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.* 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/honorcodes/honorcode.php.

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 Helping 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/**
   Counseling Services
   Groups and Workshops
   Outreach and Consultation
   Self-Help Library
   Training Programs
   Community Provider Database

2. U Matter We Care, **www.umatter.ufl.edu/**
3. *Career Resource Center,* First Floor JWRU, 392-1601, **www.crc.ufl.edu/**

Distance Classes:

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://distance.ufl.edu/student-complaints for more details.

DATES

Events	Fall 2016
Classes Begin	August 22
Classes End	December 7
Reading Days	December 8-9
Finals	Dec. 10, 12-16
Holidays - no classes	Sept. 5, Labor Day Oct. 14, Homecoming Nov. 11, Veterans Day Nov. 23-25, Thanksgiving

OTHER IMPORTANT DATES:

Soil Science Society of America meetings https://soils.org/	Nov. 6-10
American Water Resources Association http://www.awra.org/meetings/Orlando2016/	Nov. 14-17

Tentative Schedule Fall 2016

All due dates of HW and Discussions are posted on Canvas under Syllabus tab and calendar

Week	Lecture Topic	Chat Date- Thursdays
1 Aug 22	**Introduction & Calculations Review** Introduction; Fertilizer Labeling & Consumption ***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*	Chat 1- August 25 **HW1-Due Sep 4** **Discussion1-Due Sept 11**
2 Aug 29	**Nitrogen Cycle** N-Cycle and Inorganic/Organic Sources of N ***Read:*** 1. Textbook, Chapter 4 Nitrogen	Chat 2- Sept. 1
3 Sept 6	Nitrification/Denitrification & Slow release fertilizers 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 • *HW 2- Fertilizer rates*	Chat 3 - Sept. 8 **HW2 -Due Sep 18**
4 Sept 12	**Organic N and Mineralization &Fertilizer Rate Calculations** 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 4- Sept. 15 **Discussion2 – Due Sept 25**
5 Sept 19	**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 5 Sept. 22 **Discussion 3- due *Oct. 9*** *(after exam 1)*
6 Sept 26	**BMPs and Denitrification** 1. Reading materials for HW 3 posted on website • *HW 3- BMPS and Denitrification*	Chat 6 Sept. 29 **HW3-Due Oct. 9** **(***after exam 1)*
	EXAM 1 (lectures weeks 1-6) : **Exam available on-line**	**Oct. 1-3**
7 Oct 4	**Phosphorus** Role of P in plant nutrition; Soil phosphorus reactions ***Read:*** 1. Textbook, Chapter 5 pp. 185-208	Chat 7 Oct. 6

	2. Several papers on P posted under Lessons/ References	
8 Oct 10	P fertilizers and reaction in soils; Factors affecting P availability. Read Textbook, Chapter 5 pp. 208-220 • *HW 4 Fertilizer formulations*	Chat 8 Oct. 13 **HW 4 –Due Oct 23**
9 Oct 17	**Environmental Issues with Phosphorus** P and Environmental Quality; Soil test P Read: 1. Textbook, Chapter 9 - soil test P pgs 332-347 2. Discussion 4: BMPs for P	Chat 9 Oct. 20 **Discussion 4 Due Oct. 30**
10 Oct 24	**Potassium & Soil Fertility Evaluation** Functions, soil sources and materials Read: **1.** Textbook , Chapter 6 Potassium **2.** Textbook, Chapter 9 Soil fertility evaluation • *HW 5*	Chat 10 Oct. 27 **HW 5: Due Nov 4 (Friday)**
11 Oct 31	Reactions of K fertilizers with soil Guest Lecture- Turf grass nutrition ; Bonus Discussion 1	Chat 11 Nov 3 Bonus Discussion 1- Due Nov. 13
	EXAM II (lectures week 7-11)): Exam available on-line	**Nov. 5-7**
12 Nov 7	**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*	***No Chat Nov 10*** *Chat 12 Nov. 17* *tentative (we may need to meet Friday Nov 18 instead due to travel)* **HW 6 Due Nov. 20**
13 Nov 14	**Organic Farming and sustainable agriculture** • Discussion 6: Organic vs conventional farming	No chat for this topic **Discussion 5 due Nov 28**
14 Nov 21	Guest lecture – Palm nutrition Catch up on class materials	No Chat Nov. 24 Thanksgiving
15 Nov 28	**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 • Discussion 6 – trace elements	Chat 13 Dec. 1 Last chat **Discussion 6 – Due Dec. 6**
16 Dec 5	**Last day of classes Dec 7;** Bonus Discussion 2- Class topics	Bonus Discussion 2– Due Dec. 5
	EXAM III (include lectures weeks 12-15) Available Dates	**Dec 6-7 &. 10**