SWS 5115 – Environmental Nutrient Management (3 credits)
Spring 2022

Course description

Catalog description: Consumption, existing reserves, formulation, chemical and physical properties, and manufacture of commercial fertilizers; basic chemical reactions of fertilizer materials with the soil and the fate of the nutritional elements whether it be loss by leaching, plant uptake, fixation or soil retention.

This course focuses on how plant nutritional requirements can be satisfied to maximize yields, maintain soil fertility and soil health, and minimize environmental impacts. We will examine the role essential nutrients play in plant nutrition and how key biogeochemical reactions affect their availability in soils. We will cover how different fertility sources – primarily fertilizers but also manures, composts, etc. – supply nutrients to plants as well as challenges associated with their use. This course will present tools to manage soil nutrients sustainably, including soil and plant tissue testing, criteria to determine nutrient input requirements, and best management practices.

Prerequisites

SWS 3022 – Introduction to Soils in the Environment, SWS 5050 – Soils for Environmental Professionals or consent from instructor

Instructor

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Office hours: by appointment (don't be shy to request an appointment!)

Chat session meeting times: Tuesday, 5:30-6:30 PM, Eastern time

Course objectives

At the end of this class, students will be able to:

1. Describe nutrient cycles for nitrogen, phosphorus, and potassium in detail, including how they are measured in soils and their effect on crop production;
2. Compare the effects of different fertility sources (e.g., fertilizers vs. manures) and different forms of a given source (e.g., urea vs. ammonium nitrate fertilizers) on nutrient cycling;
3. Quantify crop nutrient demand and fertilizer/manure input rates to meet that demand;
4. Identify and evaluate the efficiency of different best management practices (BMPs);
5. Contrast different approaches used to manage soil fertility (e.g., conventional and organic);
6. Interpret soil testing results and nutrient input recommendations.

Textbook

There is no textbook requirement of this class, but the following textbook is highly recommended for students that envision a career where soil fertility plays a large role (e.g., crop consultant, extension agent), including D.P.M. students. An electronic copy of the book should be available on course reserve.

Soil Fertility and Fertilizers (8th Ed.) by John Havlin et al. 2013; ISBN 013503373X, Pearson.

Course format

The class is all-online, asynchronous, with a combination of pre-recorded lectures, a discussion board, and a weekly chat. The weekly chat will occur via zoom, using the URL provided on the canvas page. Log in to http://elearning.ufl.edu/.

The course is structured in three modules, with materials becoming available one week at a time. At the end of each module, students will complete an exam. All students must do the exam within a specific 4-day window, but they may go through the materials of that module at their own pace, once each week is online. The first two exams will only cover the materials presented in the module whereas the final exam will be cumulative.

Chat sessions will have both audio and video recorded for students in the class to refer later 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. Likewise, students who un-mute during class and participate orally are agreeing to have their voices recorded. If you are unwilling to consent to have your profile image, video or voice recorded, be sure to keep your camera and mic off and do not use a profile image. For those that prefer to remain muted, you can communicate using the "chat" feature in zoom, which allows students to type questions and comments live.

Make-Up Policy

Late assignments (problem sets, discussions) will get a 20% deduction for each late day, up to 2 days; if submitted on or after the 3rd day, the student will be assigned the grade 0. Exams must be completed during the allocated period (no late submissions accepted).

Please refer the official University policy for additional details: https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx.

Grading system

Item	Points	Percentage
Exam 1 (Soils and crops review, N and P cycles)	125	12.5%
Exam 2 (Other macronutrients, micronutrients, acidity, salinity)	125	12.5%
Cumulative final exam (covers **all** material from the class)	250	25%
6 problem sets (5% each)	300	30%
5 discussions (4% each)	200	20%

Grade scale

Letter	Points	Percentage
A	≥ 950	95 - 100
A-	≥ 900	90 - 94.9
B+	≥ 850	85 - 89.9
B	≥ 800	80 - 84.9
B-	≥ 760	76 - 79.9

Letter	Points	Percentage
C+	≥ 720	72 - 75.9
C	≥ 680	68 - 71.9
C-	≥ 640	64 - 67.9
D	≥ 600	60 - 63.9
E	< 600	< 60

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

Additional information

Online Course Evaluation Process

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 period 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.* 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. **All assignments in this class are individual assignments; collaboration in doing assignments is therefore prohibited.** 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: https://sccr.dso.ufl.edu/process/student-honor-code/.

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.

Services for Students with Disabilities

Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the disability Resource Center. Click here to get started with the Disability Resource Center. It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

In-Class Recording

Students are allowed to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled. The only allowable purposes are (1) for personal educational use, (2) in connection with a complaint to the university, or (3) as evidence in, or in preparation for, a criminal or civil proceeding. All other purposes are prohibited. Specifically, students may not publish recorded lectures without the written consent of the instructor.

A "class lecture" is an educational presentation intended to inform or teach enrolled students about a particular subject, including any instructor-led discussions that form part of the presentation, and delivered by any instructor hired or appointed by the University, or by a guest instructor, as part of a University of Florida course. A class lecture does not include lab sessions, student presentations, clinical presentations such as patient history, academic exercises involving solely student participation, assessments (quizzes, tests, exams), field trips, private conversations between students in the class or between a student and the faculty or lecturer during a class session.

Publication without permission of the instructor is prohibited. To "publish" means to share, transmit, circulate, distribute, or provide access to a recording, regardless of format or medium, to another person (or persons), including but not limited to another student within the same class section. Additionally, a recording, or transcript of a recording, is considered published if it is posted on or uploaded to, in whole or in part, any media platform, including but not limited to social media, book, magazine, newspaper, leaflet, or third party note/tutoring services. A student who publishes a recording without written consent may be subject to a civil cause of action instituted by a person injured by the publication and/or discipline under UF Regulation 4.040 Student Honor Code and Student Conduct Code.

Campus Resources

Health and Wellness

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.

Counseling and Wellness Center: Visit the Counseling and Wellness Center website or call 352-392-1575 for information on crisis services as well as non-crisis services.

Student Health Care Center: Call 352-392-1161 for 24/7 information to help you find the care you need, or visit the Student Health Care Center website.

University Police Department: Visit UF Police Department website or call 352-392-1111 (or 9-1-1 for emergencies).

UF Health Shands Emergency Room / Trauma Center: For immediate medical care call 352-733-0111 or go to the emergency room at 1515 SW Archer Road, Gainesville, FL 32608; Visit the UF Health Emergency Room and Trauma Center website.

GatorWell Health Promotion Services: For prevention services focused on optimal wellbeing, including Wellness Coaching for Academic Success, visit the GatorWell website or call 352-273-4450.

Academic Resources

E-learning technical support: Contact the UF Computing Help Desk at 352-392-4357 or via e-mail at helpdesk@ufl.edu.

Career Connections Center: Reitz Union Suite 1300, 352-392-1601. Career assistance and counseling services.

Library Support: Various ways to receive assistance with respect to using the libraries or finding resources.

Teaching Center: Broward Hall, 352-392-2010 or to make an appointment 352- 392-6420. General study skills and tutoring.

Writing Studio: 2215 Turlington Hall, 352-846-1138. Help brainstorming, formatting, and writing papers.

Student Complaints On-Campus: Visit the Student Honor Code and Student Conduct Code webpage for more information.

On-Line Students Complaints: View the Distance Learning Student Complaint Process.

<u>Tentative</u> schedule (updates and changes will be posted on the class canvas page)

Week	Topic	Readings	Assignments due
1 (1/5-1/7)	Introduction Optional: review of crop physiology/nutrition, soil science	Chapter 1 Chapter 2 (optional)	Bonus discussion – Introduce yourself
2 (1/10-1/14)	Nitrogen cycle	Chapter 4 (117-161)	
3 (1/18-1/21)	Nitrogen inputs	Chapter 4 (161-183)	Problem set #1 – N fertilizers
4 (1/24-1/28)	Phosphorus cycling	Chapter 5 (185-208)	Discussion #1 – Enhanced efficiency fertilizers
5 (1/31-2/4)	Phosphorus inputs	Chapter 5 (208-221) Chapter 10 (409-420)	Discussion #2 – P cycling
2/3-2/6	**Exam # 1: Soil and crop nutrition review, N & P cycles (weeks 1-5)**		
6 (2/7-2/11)	Potassium cycling and inputs	Chapter 6	Problem set #2 – P fertilizers and organic amendments
7 (2/14-2/18)	Sulfur, calcium, and magnesium	Chapter 7	Discussion #3 – K in agriculture
8 (2/21-2/25)	Micronutrients	Chapter 8	Problem set #3 – Other fertilizers
9 (2/28-3/4)	Soil acidity/alkalinity Soil salinity/sodicity	Chapter 3	
3/3-3/6	**Exam # 2: K, Ca, Mg, S, micronutrients, soil acidity/salinity (weeks 6-9)**		
3/7-3/11	**Spring break (no class)**		
10 (3/14-3/18)	Nutrient management & 4Rs 5th R: irrigation management	Chapter 10 (all but 409-420) Chapter 11	Problem set #4 – soil pH
11 (3/21-3/25)	Soil and plant nutrient testing	Chapter 9 (307-362)	
12 (3/28-4/1)	Environmental impacts of agriculture	Chapter 12 (476-501)	Problem set #5 – Soil testing
13 (4/4-4/8)	BMPs		Discussion #4 – BMPs & environmental impacts
14 (4/11-4/15	Soil health, crop rotations & cover crops	Chapter 12 (451-476)	Problem set #6 – BMPs & environmental impacts
15 (4/18-4/20)	Organic and conventional agriculture		Discussion #5 – Soil health
4/23-4/26	**Final cumulative exam (weeks 1-15)**		