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
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 2018 semester is http://mbreeze.ifas.ufl.edu/rey2pqg6vqbw/
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. Please check the website under the “Start Here” Page and technical

GRADES AND GRADE POINTS

<table>
<thead>
<tr>
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<th>Points</th>
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<tbody>
<tr>
<td>Module I Exam</td>
<td>110</td>
</tr>
<tr>
<td>Module II Exam</td>
<td>100</td>
</tr>
<tr>
<td>Module III Exam</td>
<td>100</td>
</tr>
<tr>
<td>6 Problem Sets</td>
<td>120</td>
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<tr>
<td>6 Discussions</td>
<td>120</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>550</strong></td>
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In addition, there will be three 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

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


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/](http://www.umatter.ufl.edu/)
3. Career Resource Center, First Floor JWRU, 392-1601, [www.crc.ufl.edu/](http://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](http://distance.ufl.edu/student-complaints) for more details.

**DATES**

<table>
<thead>
<tr>
<th>Events</th>
<th>Fall 2018</th>
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<tbody>
<tr>
<td>Classes Begin</td>
<td>August 22</td>
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<tr>
<td>Classes End</td>
<td>December 5</td>
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<tr>
<td>Reading Days</td>
<td>December 6-7</td>
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<tr>
<td>Finals</td>
<td>Dec. 8, 10-14</td>
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<tr>
<td>Holidays - no classes</td>
<td>Sept. 3, Labor Day</td>
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<td>Nov. 2, Homecoming</td>
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<td>Nov. 12, Veterans Day</td>
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<td>Nov. 21-23, Thanksgiving</td>
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**PROFESSIONAL SOCIETY MEETINGS OF INTEREST:**

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
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<tbody>
<tr>
<td>Soil Science Society of America meetings</td>
<td>Jan 6-9, 2019</td>
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<tr>
<td><a href="https://soils.org/">https://soils.org/</a></td>
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<tr>
<td>American Water Resources Association</td>
<td>Nov. 4-8, 2018</td>
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</tbody>
</table>
**Tentative Schedule Fall 2018**

*All due dates of HW and Discussions are posted on Canvas under Syllabus tab and Calendar. HW are normally due on Fridays with 48 h grace period (5% penalty on grade); Discussions are normally due on Sundays (Exceptions are noted below)*

<table>
<thead>
<tr>
<th>Week</th>
<th>Lecture Topic</th>
<th>Chat Date - Thursdays</th>
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<tbody>
<tr>
<td>1</td>
<td>Introduction &amp; Calculations Review</td>
<td>Chat 1- August 23 Cancelled! HW1-Due Sep 7</td>
</tr>
<tr>
<td>1</td>
<td>Introduction; Fertilizer Labeling &amp; Consumption</td>
<td>Discussion1-please introduce yourself no later than Sept 10</td>
</tr>
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| 1    | 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 | |
| 2    | Nitrogen Cycle | Chat 2- Aug 30 |
| 2    | N-Cycle and Inorganic/Organic Sources of N | |
| 2    | Read: 1. Textbook, Chapter 4 Nitrogen | |
| 3    | Nitrification/Denitrification & Slow release fertilizers | Chat 3 - Sept. 6 HW2-Due Sep 21 |
| 3    | 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 | |
| 4    | Organic N and Mineralization & Fertilizer Rate Calculations | Chat 4- Sept. 13 |
| 4    | Organic N and mineralization | Discussion2 – Due Sept 30 |
| 4    | 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) | |
| 5    | Environmental Issues with Nitrogen | Chat 5 Sept. 20 |
| 5    | N-BMPs and TMDLs | Discussion 3- Due Oct. 14 (after exam 1) |
| 5    | Read: 1. Textbook, Chapter 12 -Agricultural Productivity and Environmental Quality (Focus on pp 476-501)  
• Discussion 3: N BMPs | |
| 6    | BMPs and Denitrification | Chat 6 Sept. 27 |
| 6    | Read: 1. Reading materials for HW 3 posted on website  
• HW 3- BMPS and Denitrification | HW3-Due Oct. 12 (after exam 1) |
| 7    | Phosphorus | Chat 7 Oct. 4 |
| 7    | Role of P in plant nutrition; Soil phosphorus reactions | |

**EXAM 1 (lectures weeks 1-6): Exam available on-line**
<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Read:</th>
<th>Chat/Due Date</th>
</tr>
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</table>
| 8 Oct 8| P fertilizers and reaction in soils; Factors affecting P availability.                           | 1. Textbook, Chapter 5 pp. 185-208  
2. Several papers on P posted under Lessons/References | Chat 8 Oct. 11  
HW 4 –Due Oct 26 |
| 9 Oct 15| Environmental Issues with Phosphorus                                                            | Environmental issues with phosphorus; Soil test P  
Read:  
1. Textbook, Chapter 9 - soil test P pgs 332-347  
2. Discussion 4: BMPs for P | Chat 9 Oct. 18  
Discussion 4 Due Oct. 28 |
| 10 Oct 22| 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. 25  
HW 5: Due Nov 9 (No grace period) |
| 11 Oct 29| Reactions of K fertilizers with soil                                                              | Reactions of K fertilizers with soil  
Guest Lecture- Turf grass nutrition ; Bonus Discussion 1 | Chat 11 Nov 1  
Bonus Discussion 1- Due Nov. 18 |
| 12 Nov 5| 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 | Chat 12 Nov. 15  
HW 6 Due Nov. 20 (Tuesday) |
| 13 Nov 13| Organic Farming and sustainable agriculture                                                      | Organic Farming and sustainable agriculture  
   - Discussion 6: Organic vs conventional farming | No chat for this topic  
Discussion 5 due Nov 30 (FRI) |
| 14 Nov 19| Guest lecture – Palm nutrition                                                                   | Guest lecture – Palm nutrition  
Catch up on class materials | No Chat Nov. 23  
Thanksgiving  
Bonus Discussion 2 Due Nov 30 (FRI) |
| 15 Nov 26| Micronutrients and Trace Elements                                                                | Micronutrients and Trace Elements  
General Cycle and reactions of micronutrients; Micronutrient fertilizers;  
Environmental issues with trace elements  
Read:  
1. Textbook, Chapter 8  
Last chat!  
Discussion 6 trace elements –Due Dec.5 (Wed) |
| 16 Dec 3| Last day of classes Dec 7; Bonus Discussion 2- Class topics                                      | Last day of classes Dec 7; Bonus Discussion 2- Class topics | Bonus Discussion 3– Due Dec 5(Wed) |
|        | EXAM III (include lectures weeks 12-15) Available Dates                                          | EXAM III (include lectures weeks 12-15) Available Dates | Dec 8-10        |