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**SWS 4116**  
**Environmental Nutrient Management**  
**3 credits**  
**Fall 2022**

<b>INSTRUCTOR: Dr. Kelly T. Morgan</b> Professor, Soil, Water, and Ecosystem Sciences Dept. <a href="mailto:conserv@ufl.edu">conserv@ufl.edu</a> <b>Office:</b> University of Florida, Soil, Water, and Ecosystem Sciences Dept., 2157 McCary Hall A Gainesville, FL 32611; Tel: (863) 289-1910			
<b>TEACHING ASSISTANTS:</b>			
<b>Noel Manirakiza</b>	<a href="mailto:nmanirakiza@ufl.edu">nmanirakiza@ufl.edu</a>	<b>Students Last Names A - G</b>	
<b>Yasmeen Saleem</b>	<a href="mailto:saleemyasmeen@ufl.edu">saleemyasmeen@ufl.edu</a>	<b>Students Last Names H - W</b>	

**LECTURE:**

All lecture materials are posted on class website. We will be meeting for chat time every Tuesday starting August 30, 2022 (unless otherwise indicated on Canvas Calendar) from **6-7:30 pm ET** using Zoom. The chat will be used to go over calculations and answer any questions you may have on HW, quizzes and class materials. Chat time is HIGHLY RECOMMENDED

**TEXTBOOK:**

*The following textbook is **Recommended**:* Soil Fertility / Edition 2 by Boyd Ellis and Henry Foth. 1996; ISBN 1566702437, Taylor & Francis publishers.

**PREREQUISITES:** SWS 3022

**COURSE DESCRIPTION:**

The course will cover the basic principles of plant nutrition, fertilizer use, and environmental management of nutrients. Essential plant nutrients will be examined in relation to their function and deficiency symptoms in plants and their chemistry in the soil. The course will cover the properties and use of fertilizers for supplying plant nutrients, chemical reaction of fertilizers in soils and agronomic and economic criteria for determining fertilization. The class will cover environmental issues with the overuse of fertilizers, best management practices to reduce impact of conventional agriculture on environment, soil and plant tissue testing, sustainable agriculture and organic farming.

**COURSE GOALS**

- a. To understand the chemistry of essential elements in the soil in relation to their functions in plant nutrition
- b. To learn about the different types of fertilizers, when and how to use appropriately.
- c. To recognize the impact of conventional agriculture including use of fertilizer and amendments on water and air quality.

- d. To identify best management practices (BMPs) and practices used in sustainable agriculture and organic farming

### COURSE LEARNING OBJECTIVES

1. Identify the essential elements, their functions in the plant and deficiency symptoms.
2. Classify and categorize the different sources of fertilizer materials and their suitability of use in various soils and cropping systems.
3. Solve for fertilizer application rates and fertilizer formulation
4. Discuss the environmental impacts of agriculture, use of fertilizers and amendments
5. Compare practices used in organic farming and sustainable agriculture

### INTERNET ACCESS:

Lectures of the class (power point presentations and pdf files), assignments and handouts are posted on the class website on Canvas. Go to <http://elearning.ufl.edu/> log on using your Gatorlink. You need to have a gatorlink account <http://www.gatorlink.ufl.edu/> to be able to log on to the class.

### CHAT SESSIONS:

The chat will be online using Zoom on Tuesdays 6-7:30 pm ET unless otherwise indicated on lecture schedule. **The zoom URL for all chat meetings for Fall 2022 is posted on class website.**

Our chat 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.

### GRADING:

This class has required **HW, Discussion posts, Quizzes and Exams**. Your grade will be determined with accumulated points on various assignments as listed in the Table below. All assignments are submitted within Canvas. Please do not email any assignment. Quizzes and exams are normally available over a 3-day period. Some discussions need only one post while others need one initial post and at least 2 replies or further discussions. Expectations and rubric for discussions are clearly illustrated on class website. For information on current UF policies for assigning grade points, see:

<https://catalog.ufl.edu/UGRD/academic-regulations/grades-grading-policies/>

Grading	Points	
9 HW Assignments	120	
6 Discussions	90	
6 Quizzes	135	
Exam 1	85	

Exam 2	85	
<b>Total</b>	<b>515</b>	
<i>Bonus Points</i>	<b>22</b>	

**There are opportunities to earn 22 bonus points for a total of 537 possible points.**

**GRADE SCALE:**

A ≥ 473 points	C+ ≥ 386 points
A- ≥ 458 points	C ≥ 370 points
B+ ≥ 443 points	C- ≥ 350 points
B ≥ 427 points	D+ ≥ 324 points
B- ≥ 412 points	D ≥ 309 points

**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/UGRD/academic-regulations/attendance-policies/>

**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.bluer.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 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 Conduct Code specifies a number of behaviors that are in violation of this code and the possible sanctions. [Click here to read the Conduct Code](#). If you have any questions or concerns, please consult with the instructor or TAs in this class. 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.

**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:

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](mailto: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](mailto: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](#).

## MODULE AND LECTURE SCHEDULE

- Chats every Tuesday 6-7:30 pm ET using zoom. Link on class website, *First Chat Tuesday August 31 @ 6 pm ET*
- HW Assignments are due on Sundays @11:55 pm ET (24 h grace period till Mondays @11:55 pm with 5% penalty on grade)
- Discussion Assignments First post due on Fridays @11:55 pm ET, and replies/ final posts on Mondays @ 11:55 pm
- Quizzes and exams are available Saturdays 6 am ET through Monday @11:55 pm ET  
Exceptions (designated by \*E) are noted below

Week	Module #	SUBJECT	CHAPTER textbook	Assessment	Due Date
		<i>Introduce yourself under Discussions</i>		<i>Bonus Discussion 1</i>	<i>8/29</i>
<b>1</b> <b>8/23</b>	<b>Review</b>	Chemistry and Calculations Review	-	HW # 1	<i>9/5</i>
	<b>1</b>	History of soil fertility	1	Discussion #1	<i>8/29</i>
<b>2</b> <b>8/30</b>	<b>2</b>	Introduction to soil fertility and plant nutrition a. Essential elements, Macronutrients, Micronutrients b. Nutrient movement and uptake by roots	1	<i>Quiz #1</i> (Module 2)	<i>9/7</i>
<b>3</b> <b>9/6</b>	<b>3</b>	Nitrogen Chemistry and Environmental Issues a. Function in plant; Deficiency symptoms b. Chemistry & biochemistry in soil c. Environmental issues with N	6	HW #2	<i>9/12</i>
<b>4</b> <b>9/13</b>	<b>4</b>	Nitrogen Fertilizers	11.1	<i>Quiz # 2</i> (Module 3 & 4)	<i>9/20</i>
	<b>5</b>	Nutrient Content in fertilizers The Florida Fertilizer Label		<b>Bonus</b> Activity 1 Exercise Handout HW # 3	<i>9/19</i> <i>9/19</i>
<b>5</b> <b>9/20</b>	<b>6</b>	Phosphorus Chemistry and Environmental Issues a. Function in plant; Deficiency symptoms b. Chemistry & biochemistry in soil	7	HW #4	<i>9/26</i>
<b>6</b> <b>9/27</b>	<b>7</b>	Environmental issues with P Phosphorus fertilizers	11.2, 11.3, 11.4	Discussion #2 <b>Quiz # 3</b> (Module 6 & 7)	<i>10/11 *E</i> <i>10/4</i>
		<b>Exam 1 (Modules 2 -7)</b> <i>Chat for exam review/questions:</i> <i>Tuesday Sept. 28 @ 6 – 7:30 pm ET</i>			<i>10/4</i>

<b>Week</b>	<b>Module #</b>	<b>SUBJECT</b>	<b>CHAPTER textbook</b>	<b>Assessment</b>	<b>Due Date</b>
<b>7</b> <b>10/4</b>	<b>8</b>	Potassium: a. Function in plant; Deficiency symptoms b. Chemistry & biochemistry in soil c. K fertilizers	8	HW #5	<b>10/17</b>
<b>8</b> <b>10/11</b>	<b>9</b>	Soil fertility evaluation	13	Discussion #3	<b>10/22</b>
<b>9</b> <b>10/18</b>	<b>10</b>	Fertilizer application rates calculation		HW # 6	<b>10/24</b>
<b>10</b> <b>10/25</b>	<b>11</b>	Calcium, Magnesium, Sulfur: a. Function in plant; Deficiency symptoms b. Chemistry & biochemistry in soil c. Fertilizer sources: Lime, Sulfur	9	HW # 7  <b>Quiz # 4</b> <b>Modules 8 &amp; 11</b>	<b>10/31</b>  <b>11/1</b>
<b>11</b> <b>11/1</b>	<b>12</b>	Micronutrients a. Function in plant; Deficiency symptoms b. Chemistry & biochemistry in soil c. Micronutrient fertilizers	10	HW #8  <b>Quiz # 5</b> <b>Module 12</b>	<b>11/7</b>  <b>11/8</b>
<b>12</b> <b>11/8</b>	<b>13</b>	<b>Nutrition of Florida crops:</b> <b>Turfgrass (Guest speaker- Dr. Rowland)</b>		<b>Bonus</b> Discussion 2	<b>11/12</b>
		<b>Exam 2 (Modules 8-12)</b> <b>Chat for exam review/questions:</b> <b><u>Tue. Nov 2 @ 6 – 7:30pm ET</u></b> <b><i>Additional chat Friday Nov 5, time TBA</i></b>			<b>11/15</b>
<b>13</b> <b>11/15</b>	<b>14</b>	Environmental issues Trace elements Climate change greenhouse gases <b><i>NO chat Tuesday Nov. 23</i></b> <b><i>Thanksgiving Holiday Nov. 24-26</i></b>		Discussion #4  <b>Bonus</b> Discussion3	<b>11/19</b>  <b>11/23 *E</b>
<b>14</b> <b>11/22</b>	<b>15</b>	Fertilizer formulations calculations: Rules of working fertilizer problems Mixed fertilizers; Fertilizer application method	14	HW # 9	<b>12/5</b>
<b>15</b> <b>11/29</b>	<b>16</b>	Sustainable Agriculture & Organic Farming		Discussion #5 <b>Bonus</b> Activity 2	<b>12/3</b> <b>12/3</b>
<b>16</b> <b>12/6</b>	<b>17</b>	<b>Nutrition of Florida Crops:</b> <b>Palm trees (Guest speaker: Dr. Broschat)</b>		Discussion #6	<b>12/8</b>
		<b><i>Last chat Tuesday Dec. 7, 2021: Questions for Quiz 6</i></b>		<b>Quiz #6</b> <b>(Modules 14-16)</b>	<b>12/ 8 &amp;</b> <b>12/13</b>

<i>Week</i>	<b>Module #</b>	<b>SUBJECT</b>	<b>CHAPTER textbook</b>	<b>Assessment</b>	<b>Due Date</b>
		<b>Classes end Dec 8</b> <b>Reading Days Dec 9-10</b>			

<b>Summary of Quizzes &amp; exams Due dates</b> <b>DUE on Mondays at 11:55 pm ET</b> <b>and available for 4 days: Fridays through Mondays</b>		
		<b>Due- Mondays</b>
<b>Quiz #1</b>	<b>Module 2</b>	<b>9/7</b>
<b>Quiz #2</b>	<b>Module 3 &amp; 4</b>	<b>9/20</b>
<b>Quiz #3</b>	<b>Module 6 &amp; 7</b>	<b>10/4</b>
<b>EXAM 1</b>	<b>Modules 3-7</b>	<b>10/4</b>
<b>Quiz #4</b>	<b>Modules 8 &amp; 11</b>	<b>11/1</b>
<b>Quiz #5</b>	<b>Module 12</b>	<b>11/8</b>
<b>EXAM 2</b>	<b>Modules 8-12</b>	<b>11/15</b>
<b>Quiz #6</b>	<b>Modules 14-16</b>	<b>12/8 &amp; 12/13</b>