Nutrition of Horticultural Crops
HOS 6412 - 3 CREDITS
SPRING 2019

MEETING TIMES AND LOCATIONS
Monday and Wednesday  11:45AM to 1:40PM (5th and 6th period)
Fifield Hall room 2316

INSTRUCTOR
Gerardo Nunez, Ph.D.   g.nunez@ufl.edu
Fifield Hall 1113
(352) 273 - 4765
Office hours: Mondays 10:00AM to 11:45AM

COURSE DESCRIPTION
This course encompasses the biochemical, physiological, and environmental factors that affect the nutritional status and productivity of horticultural crops. In order to deliver meaningful mastery of these contents, this course utilizes a combination of lectures, quantitative exercises, and field activities.

This might be the most time-consuming course you take this semester! Please, manage your time wisely, knowing that there will be assigned readings and deliverables due most weeks of the semester.

LEARNING OBJECTIVES
Upon successful completion of this course, students will be able to:

• Explain how chemical and physical properties of soils and substrates affect nutrient movement and availability
• Assess strengths and weaknesses of different fertilizer types, sources, and application methods
• Classify nutrients as essential, beneficial, and non-essential for plant growth
• Sample for, submit, and interpret soil, water, and tissue tests
• Diagnose nutrient deficiencies and recommend corrective measures
• Create fertilizer schedules for different horticultural production systems
• Apply a nutrient management plan for a horticultural crop
• Think critically about experimental design for plant nutrition
• Compose a graduate student grant focused on plant nutrition

Syllabus - 01
COURSE MATERIALS

Textbooks
There is no required textbook for this course. The following three textbooks can be used as reference materials. They are available as e-books through UF/IFAS Extension and UF Libraries. Additional learning materials will be provided via Canvas.

- Vegetable Production Handbook of Florida   Freeman, Vallad & Dittmar

Personal Computer
A personal computer with Microsoft Excel 2013 or more recent will be required for in-class and at-home exercises. While tablet computers are capable of running Microsoft Excel, some of the functions we will use are not available in these devices. Thus, a laptop computer is strongly advised.

Microsoft Excel is available to you free of cost through UF Apps. You can download this software to all your devices using your GatorLink credentials.

- UF Apps, https://info.apps.ufl.edu/

Course Website
This course has a comprehensive mini-site in Canvas. Take time to familiarize yourself with the “Start Here”, “Syllabus”, “Course Materials”, and “Grades” tabs in the navigation menu. Digital copies of this syllabus, and other learning materials can be found there.

- E-Learning in Canvas, www.elearning.ufl.edu

Podcast
Student feedback suggests that I am a very fast-paced speaker. I will try my best to slow down, but -just in case I speed up- audio recordings will be available within 7 days of the lecture in canvas. Only classroom-based lectures will be recorded. Your contributions (class summaries, questions, etc.) will also be recorded.
COURSE GRADE

1. **Peer review simulation** 20 points
   Once per month, the instructor will post a scientific article and several essay-type questions. Students must carefully read and understand the scientific article and select one question to answer. Students cannot answer a question that another student has previously answered. Answers must resemble scientific peer review in format and content. Answers to the instructor prompt are meant to start an academic conversation about the scientific merits of the article. Answers must be submitted through the Discussions tab in Canvas. Students will post their answer to the prompt questions by the midpoint of the month (10 points), and comment on their classmates’ answers by the end of the month (10 points).

2. **SARE Graduate Grant Application** 30 points
   Successful grantsmanship is an essential skill for horticulturists with advanced degrees. This assignment is designed to train students in writing grant proposals. We will use the 2018 Graduate Student Grant in Sustainable Agriculture CFP as our guidelines. Students will submit draft Objectives, Rationale, Justification, and Approach documents at different times during the semester. The instructor will provide feedback on how to improve these sections. Finally, students will submit a final proposal to the instructor (g.nunez@ufl.edu) on May 1st at/before 5:00PM. Draft submissions will be graded out of 5 points, each. Final proposals will be graded out of 10 points.

   Your final proposal for this course constitutes an excellent starting point for a SARE application in 2019. Please, consider how this grant could further your careers goals.

3. **Exams** 30 points
   You will be evaluated through three cumulative exams. Each exam will be graded out of 100 points. The sum of your exam scores will be divided by 100 and used as your exam grade. Exam #1 and #2 will test your knowledge, quantitative skills, and critical thinking through long and short answer questions. Exam #3 will be an oral exam where you will diagnose nutrient deficiencies and recommend corrective measures on live plant samples.

4. **Fertilizer schedules** 20 points
   This assignment will test your logical and quantitative skills to design three fertilizer schedules: one for an open field operation, one for a hydroponic operation, and one for a fertigation operation. I will demonstrate the necessary calculations with two essential elements. Then, you will complete all macronutrients in class, and all micronutrients at home. Each fertilizer schedule will be graded out of 20 points, and the average of your scores will be used as your grade. Additional details about this assignment will be provided in Handouts 1-3.

   These assignments will require a fair degree of familiarity with spreadsheet software. Students who are unfamiliar with or need to brush up on their Excel skills should complete this tutorial before the start of the in-class activities.

   - **Excel Easy tutorial**, [www.excel-easy.com](http://www.excel-easy.com)
GRADING SCALE

- **A** = 90 – 100 points
- **B+** = < 90 - 87 points
- **B** = < 87 - 83 points
- **B-** = < 83 - 80 points
- **C** = < 80 - > 60 points
- **E** = < 60 points

Additional information on current UF grading policies for assigning grade points can be found here:

COURSE POLICIES

**Attendance**

You are encouraged to attend every class. Attendance will be taken based on a *photo book*. You must contribute to the creation of the course *photo book* by emailing the instructor a clear photo of your face during the first week of the semester.

Absences will be excused, late assignments will be graded, and make up-exams will be provided for documented emergencies as per UF’s attendance policy. However, I am aware that sometimes life throws you a *curve ball*. Thus, you are allowed one no-questions-asked absence per semester. You cannot use your no-questions-asked absence on a date when exams, or assignments are due.

Additional information about UF’s attendance policy can be found here:

**Classroom Etiquette**

Students are expected to be respectful learners. As such, you should arrive to and leave from class on time. Additionally, you should refrain from using electronic devices (laptops, tablets, and cellular phones) during class time, unless invited by the instructor. Activities such as talking, texting, sleeping, eating, and studying for other classes should also be avoided. Students who repeatedly engage in disruptive behavior during a class period will be marked absent and/or asked to leave the room.

**Written Communication**

Effective written communication is essential for student and professional success. Whether you go on to become a horticulturist, an accountant, or a CEO, written communication will be a critical skill in your repertoire. Thus, the instructor places great emphasis on coaching and participating in professional, context-specific written communication.

All course-related email communication should be polite, professional, and as different from a text message as possible. For additional recommendations, consult:
- *Email etiquette*, [www.advising.ufl.edu/docs/ProfessionalEtiquette.pdf](http://www.advising.ufl.edu/docs/ProfessionalEtiquette.pdf)

In addition to content, all written assignments will be evaluated with respect to proper spelling, grammar, punctuation, word usage, clarity, coherence, and organization. You are encouraged to use the resources provided by the UF Writing Studio to develop or enhance your writing skills. Free one-on-one tutoring (live and on-line) is available to enrolled students.
- *UF Writing Studio*, 302 Tigert Hall, 846-1138, [www.writing.ufl.edu/writing-studio/](http://www.writing.ufl.edu/writing-studio/)
Academic Honesty
In 1995, the UF student body enacted a new honor code and voluntarily committed itself to the highest standards of honesty and integrity. When students enroll at the university, they commit themselves to this standard.

The Honor Code: We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity.

On all work submitted for credit by students at the university, the following pledge is either required or implied:

“On my honor, I have neither given nor received unauthorized aid in doing this assignment.”

The university requires all members of its community to be honest in all endeavors. A fundamental principle is that the whole process of learning and pursuit of knowledge is diminished by cheating, plagiarism and other acts of academic dishonesty. In addition, every dishonest act in the academic environment affects other students adversely, from the skewing of the grading curve to giving unfair advantage for honors or for professional or graduate school admission. Therefore, the university will take severe action against dishonest students. Similarly, measures will be taken against faculty, staff and administrators who practice dishonest or demeaning behavior. Students should report any condition that facilitates dishonesty to the instructor, department chair, college dean or Student Honor Court. It is assumed all work will be completed independently unless the assignment is defined as a group project, in writing by the instructor. This policy will be vigorously upheld at all times in this course. Additionally, all work submitted for credit by students will be analyzed with originality-checking software to detect any academic misconduct.

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 when appropriate.

Campus Resources
If you are experiencing crises or personal problems that interfere with your general wellbeing, I encourage you to utilize the university’s counseling resources. The UF Counseling and Wellness Center provides a wealth of confidential, free counseling services to enrolled students.

- Counseling and Wellness Center, 3190 Radio Road, 392-1575, www.counseling.ufl.edu

Additionally, if you would like orientation on choosing a major, finding an internship, or planning your career, I encourage you to use the university’s on-campus resources.

- Career Connections Center, CR-100 Reitz Union, 392-1601, www.career.ufl.edu

Students with Disabilities
The Disability Resource Center (DRC) 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.
If you would like to request classroom accommodations, you must first register with the DRC. The DRC will provide you with documentation that you must deliver to the instructor when requesting accommodations.

- **Disability Resource Center**, 0020 Reid Hall, 392-8565, [www.dso.ufl.edu/drc/](http://www.dso.ufl.edu/drc/)

**Diversity**
The University of Florida and I place great emphasis on affirming the diversity of the student body. Student, faculty, and staff interactions with others from varied backgrounds and experiences foster a superior educational environment and nurture a healthier, more accurate understanding of how our increasingly global and multicultural society operates.

I encourage you to engage in meaningful intra- and inter-culture dialogue and support a climate that is grounded in respect and inclusion for individuals of all of races, ethnic backgrounds, genders, and sexual orientations.

**Course Evaluations**
Student assessment of instruction is an important part of the effort to improve teaching and learning. At the end of the semester, you 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:

- **Course evaluations**, [www.evaluations.ufl.edu](http://www.evaluations.ufl.edu)

Evaluations are typically open during the last two or three weeks of the semester. You will be notified of the specific times when evaluations for this course are open.
## NUTRITION OF HORTICULTURAL CROPS

### Schedule of Topics – Spring 2019

<table>
<thead>
<tr>
<th>Date</th>
<th>Class topic</th>
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<tbody>
<tr>
<td>Mon 7-Jan</td>
<td>Introduction to the course</td>
</tr>
<tr>
<td>Wed 9-Jan</td>
<td>Physical properties of soils and substrates</td>
</tr>
<tr>
<td>Mon 14-Jan</td>
<td>CEC and base saturation</td>
</tr>
<tr>
<td>Wed 16-Jan</td>
<td>Solubility, concentration, and pH</td>
</tr>
<tr>
<td>Mon 21-Jan</td>
<td>MLK Day – no class –</td>
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<tr>
<td>Wed 23-Jan</td>
<td>Soil acidity and alkalinity</td>
</tr>
<tr>
<td>Mon 28-Jan</td>
<td>Adjusting soil pH</td>
</tr>
<tr>
<td>Wed 30-Jan</td>
<td>Adjusting soil pH (part 2), Salinity</td>
</tr>
<tr>
<td>Mon 4-Feb</td>
<td>Interpreting soil test results. Organic matter</td>
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<tr>
<td>Wed 6-Feb</td>
<td>Exam #1</td>
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<tr>
<td>Mon 11-Feb</td>
<td>Movement of ions from soils to roots</td>
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<tr>
<td>Wed 13-Feb</td>
<td>Fertilizer contents and labels</td>
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<tr>
<td>Mon 18-Feb</td>
<td>Organic fertilizers</td>
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<tr>
<td>Wed 20-Feb</td>
<td>Kinds of fertilizers</td>
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<tr>
<td>Mon 25-Feb</td>
<td>Methods of fertilizer application</td>
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<tr>
<td>Wed 27-Feb</td>
<td>Placement and timing of fertilizer application</td>
</tr>
<tr>
<td>Mon 4 + Wed 6 Mar</td>
<td>Spring Break – no class –</td>
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<tr>
<td>Mon 11-Mar</td>
<td>Crop nutritional requirements, tissue sampling</td>
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<tr>
<td>Wed 13-Mar</td>
<td>Calculating fertilizer requirements</td>
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<tr>
<td>Mon 18-Mar</td>
<td>Fertilizer schedule for open field agriculture</td>
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<tr>
<td>Wed 20-Mar</td>
<td>Hydroponics and nutrient solutions</td>
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<tr>
<td>Mon 25-Mar</td>
<td>Water quality and corrections</td>
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<tr>
<td>Wed 27-Mar</td>
<td>Exam #2</td>
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<tr>
<td>Mon 1-Apr</td>
<td>Fertilizer schedule for hydroponics</td>
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<tr>
<td>Wed 3-Apr</td>
<td>Essential elements. Nitrogen</td>
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<td>Mon 8-Apr</td>
<td>Nitrogen (part 2)</td>
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<tr>
<td>Wed 10-Apr</td>
<td>Potassium and phosphorus</td>
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<tr>
<td>Mon 15-Apr</td>
<td>Sulfur, calcium, magnesium. Micronutrients</td>
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<tr>
<td>Wed 17-Apr</td>
<td>Micronutrients. Diagnosing deficiencies</td>
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<tr>
<td>Mon 22-Apr</td>
<td>Fertilizer injectors. Fertilizer schedule for fertigation</td>
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<tr>
<td>Wed 24-Apr</td>
<td>Fertilizer schedule for fertigation (part 2)</td>
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<tr>
<td>Tue 30-Apr</td>
<td>Hands-on final exam (Exam #3)</td>
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### Legend:
- Bring personal computer to class
- Fertilizer schedule due