



ABOUT THIS COURSE

This course aims to teach concepts and develop skills that enable young horticulturists to make sound nutrient management decisions in horticultural operations. In order to deliver meaningful mastery of these contents, this course utilizes a combination of lectures, quantitative exercises, computer-based exercises, and field activities. As an advanced course, *HOS3430C* builds upon student prior knowledge of chemistry, soil and water sciences, and horticultural production.





Nutrition of Horticultural Crops

HOS 3430C - 3 CREDITS

SPRING 2020

MEETING TIMES AND LOCATIONS

Monday and Wednesday

1:55PM to 3:50PM (7th and 8th period)

Fifield Hall room 2316

Horticultural Sciences Teaching Garden

INSTRUCTOR

Gerardo Nunez, Ph.D.

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Fifield Hall 1113

(352) 273 - 4765

Office hours: Wednesdays 10:00 AM to 11:30AM

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.

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
- Discuss nutrient uptake mechanisms
- 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

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
- Handbook of Plant Nutrition Barker & Pilbeam (ISBN 978-1-4398-8198-9)
- Plant Nutrition of Greenhouse Crops Sonneveld & Voogt (ISBN 978-90-481-2532-6)

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, using 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- I will post audio recordings of all lectures in canvas within 7 days of the live lecture. Only classroom-based lectures will be recorded. Please, bear in mind that your contributions will also be recorded. Audio recordings will not be posted for class periods when attendance is below 80%.

COURSE GRADE

1. Nutrient management practicum

25 points

This practicum aims to aid in developing the technical skills necessary to successfully implement a nutrient management program. Students will perform permanent and occasional duties related to the setup and maintenance of a multi-crop, multi-system horticultural operation. I will demonstrate all hands-on activities during class time, but you will have to use out-of-class time to successfully manage your farm plots and hydroponic growth systems. This will be your homework.

Duties will include planting, transplanting, pruning, training, fertilizer application, nutrient solution mixing, nutrient solution pH adjustment, leachate collection and analysis, soil, water, and tissue sampling.

2. Exams

30 points

You will be evaluated through three cumulative exams. Exam #1 and #2 will test your knowledge, quantitative skills, and critical thinking through long and short answer questions. Exam #3 will test your ability to diagnose nutrient deficiencies on live plant samples and generate fertilizer schedules. Exams will be graded out of 10 points. The sum of your exam scores will be used as your exam grade.

3. Fertilizer schedules

45 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 15 points, and the sum 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

GRADING SCALE

A	=	92 – 100 points	C	=	< 77 - 73 points
A-	=	< 92 - 90 points	C-	=	< 73 - 70 points
B+	=	< 90 - 87 points	D+	=	< 70 - 67 points
B	=	< 87 - 83 points	D	=	< 67 - 63 points
B-	=	< 83 - 80 points	D-	=	< 63 - 60 points
C+	=	< 80 - 77 points	E	=	< 60 points

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

- *Grading policy*, www.catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx

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. Subsequent unexcused absences will make you ineligible for all extra credit assignments. Additional information about UF's attendance policy can be found here:

- *Attendance policy*, www.catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx

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

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/

Growing Your Own Food

As a product of your successful nutrient management, you will grow many fruits and vegetables. We will have four monthly harvests. One half of the produce harvested will be available for you to take home, clean thoroughly, and eat. The other half of our harvest will be donated to the Allan and Cathy Hitchcock Field and Fork Food Pantry.

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/

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

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 here:

- Providing professional and respectful feedback, <https://gatorevals.aa.ufl.edu/students/>

Students will be notified when the evaluation period opens, and they can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via:

- Course evaluations, <https://ufl.bluera.com/ufl/>

NUTRITION OF HORTICULTURAL CROPS

Schedule of Topics – Spring 2020

Date	Class topic
01/06	Introduction to the course
01/08	Physical properties of soils and substrates
01/13	CEC and base saturation
01/15	Solubility, concentration, and pH
01/20	MLK Day – no class –
01/22	Soil acidity and alkalinity
01/27	Adjusting soil pH
01/29	Adjusting soil pH (part 2), Salinity
02/03	Interpreting soil test results. Organic matter
02/05	Exam #1
02/10	Movement of ions from soils to roots
02/12	Fertilizer contents and labels
02/17	Organic fertilizers
02/19	Kinds of fertilizers
02/24	Methods of fertilizer application
02/26	Placement and timing of fertilizer application
03/02-03/04	Spring Break
03/09	Crop nutritional requirements, tissue sampling
03/11	Calculating fertilizer requirements
03/16	Fertilizer schedule for open field agriculture
03/18	Hydroponics and nutrient solutions
03/23	Water quality and corrections
03/25	Exam #2
03/30	Fertilizer schedule for hydroponics
04/01	Essential elements. Nitrogen
04/06	Nitrogen (part 2) 
04/08	Potassium and phosphorus
04/13	Sulfur, calcium, magnesium. Micronutrients
04/15	Micronutrients. Diagnosing deficiencies
04/20	Fertilizer injectors. Fertilizer schedule for fertigation
04/22	Fertilizer schedule for fertigation (part 2)
Finals week	Exam #3