

**HOS 6412 (Advanced) Nutrition of Horticultural Plants**  
**Summer B odd years (3 credits) – 2015**  
**Syllabus**

Gainesville section# – 4C77  
Immokalee section # – 408F  
Lake Alfred section # – 408E

Quincy section # – 41GG  
Wimauma section# – 41GE

1 period = 75 minutes

Period	Class Begins	Class Ends
1	8:00	9:15 am
2	9:30	10:45 am
3	11:00	12:15 pm

**Coordinators and instructors:** Eric Simonne ([esimonne@ufl.edu](mailto:esimonne@ufl.edu)) and David Liu ([guodong@ufl.edu](mailto:guodong@ufl.edu)),  
1229 Fifield Hall

**Office hours:** by appointment

**Course Information:** Class meets on Tuesday for periods 2-3 (9:30-12:15), and Thursday for periods 1-3 (8:00 to 12:15), Room 1308, Fifield Hall.

**Course description:** Through lectures, invited lectures, personal and group projects, and discussions, this class consists of (a) a review of the principles of plant nutrition, irrigation schedules and nutrient management plans and, (b) critical discussions of advanced topics in plant nutrition (principles of nutrient management research, instrumentation, grafting, environmental nutrient management, composting, and genetic aspects of plant nutrition). Emphasis will be placed on active participation, team work and critical thinking.

**Objectives:** Upon completion of this course, students will be able to:

1. Apply the basic concepts of plant nutrition (including plant nutritional requirement, nutrient absorption and translocation, nutrient interactions, diagnosis of plant nutritional status, and environmental impacts of fertilization and irrigation practices) to horticultural crop production, and field diagnosis of abiotic disorders;
2. Collect meaningful soil and plant samples, understand how analytical instruments work, interpret their results and make recommendations;
3. Apply research basics (randomization and replication) to water and nutrient management research;
4. Explain how Florida laws affecting water and nutrient protect water quality and integrate fertilization and irrigation practices into nutrient cycling.

**Text book:** None required

**Reading/reference materials:**

Handbook of Plant Nutrition, A.V. Barker and D. Pilbeam, CRC Press (2007).  
Principles of Plant Nutrition, 4<sup>th</sup> ed., K. Mengel and E.A. Kirkby (1987)

Plant Nutrition Handbook II, H.A. Mills and J.B. Jones, Jr., MMP (1996)  
Plant Nutrition of Greenhouse Crops, 2009, C. Sonneveld and W. Voogt, Springer  
Mineral Nutrition of Plants: Principles and Perspectives (2<sup>nd</sup> ed.), E. Epstein and A.L. Bloom. (2005)  
ISBN: 0-87893-172-4  
Mineral Nutrition of Higher Plants (3<sup>rd</sup> ed.), P. Marschner. (2012) ISBN: 978-0-12-384905-2

**Attendance/participation:** Students are expected to arrive on time, be present and actively participate in all activities and discussions.

**UF counseling services:** Resources are available on campus for students having personal problems or lacking clear career and academic goals which interfere with their academic performance. These resources include: 1. University Counseling Center, 301 Peabody Hall, 392-1575, personal and career counseling; 2. Student Mental Health, Student Health Center, 392-1171, personal counseling; 3. Sexual Assault Recovery Services (SARS), Student Health Care Center, 392-1161, sexual assault counseling; and 4) Career Resource Center, Reitz Union, 392-1601, career development assistance and counseling.

**Accommodation:** Students requesting classroom accommodation must first register with the Dean of Students Office (Students with Disabilities Office, Peabody 202 at 352-392-1261). The Dean of Students Office will provide documentation to the student who must then provide this documentation to the Instructor when requesting accommodation. Further information is available from the Disability Resource Center at <http://www.dso.ufl.edu/drc/>.

**Software use /copyright:** 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.

**Academic honesty:** As a result of completing the registration form at the University of Florida, every student has signed the following statement: "I understand that the University of Florida expects its students to be honest in all their academic work. I agree to adhere to this commitment to academic honesty and understand that my failure to comply with this commitment may result in disciplinary action up to and including expulsion from the University." We agree to comply with the new Honor Code, which specifies that "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity."

University policy regarding "Academic Honesty" is available from the Dean of Students Office at: <http://www.dso.ufl.edu/judicial/academic.php>

More information on academic honesty and integrity is available from the Graduate Student Handbook, p. 48, available online at: <http://gradschool.rgp.ufl.edu/students/introduction.html>

The minimum consequence for cheating and/or plagiarism is getting a zero on the assignment and possibly failing this course. Exams and written assignments should represent your own work or that of your group. If you are not sure what constitutes plagiarism, please read these webpages, and ask your instructor to clarify before beginning the project.

**UF policy on e-mail:** Official University business email will be communicated to students using the

University GatorLink email account. That is, official email will be sent exclusively to GatorLinkUserName@ufl.edu. The preferred email address recorded for all students will be the GatorLink address. This is the email address displayed in the online phonebook. Students may continue to use the forwarding mechanism to deliver their email to other mail services, if they wish. However, it is the student's responsibility to insure that the forwarding address is current so that they receive official communications from the University.

**Course policy on in-class cell phone use and text messaging:** Cell phones should be turned off or put on vibrate mode and should not be answered during class activities including exams.

**Due dates and late work:** Due dates for all assignments are included in the schedule below. Summer B spans only 6 weeks and this course only meets twice a week. Students should expect a fair amount of homework. Unless arrangements have been made with the course coordinator, late work will not be accepted and no credit will be given.

**Credit for class activities:**

<b>Activity</b>	<b>Full credit</b>
Group project (GP1) - Table of essential elements	400
Group project (GP2) – Publication-ready EDIS draft	400
Leading paper discussion <sup>z</sup>	200
Participating in paper discussions	200
Final	500
<b>Total points (100%)</b>	<b>1,700</b>

<sup>z</sup> lead group will be determined on the day of the discussion

**Course grading:**

<b>Points credited</b>	<b>Percentile</b>	<b>Course grade</b>
1,700-1,581	100-93%	A
1,580-1,530	92-90%	A-
1,529-1,479	89-87%	B+
1,478-1,411	86-83%	B
1,410-1,360	82-80%	B-
1,359-1,309	79-77%	C+
1,308-1,241	76-73%	C
1,240-1,190	72-70%	C-
1,189-1,139	69-67%	D+
1,138-1,071	66-63%	D
1,070-1,020	62-60%	D-
1,019 or less	59-00%	E

**HOS 6412 (Advanced) Nutrition of Horticultural Plants  
Summer B 2015  
Lecture and Activity Schedule**

Week	Day	Date	Type	Topic	Lecturer
1	THEME I: Principles of plant nutrition, irrigation schedules and nutrient management plans				
	Tu-2	6/30	LEC  GP1 GP2	Introductions; class overview; learning goals; individual expectations What is EDIS? Group projects: Table of essential elements (due 7/14) Selection of EDIS topic (first draft due 7/23 and final version due 7/29)	Eric Simonne David Liu
	Tu-3	6/30	LEC	Critical thinking skills; Reviewing a manuscript	EHS, DL
	Th AM	7/2	Field Trip	<p>1. Growers Fertilizer Corporation, 633 NW 250th Street, Newberry, FL 32669 (352) 474-6274, Jim Smith, <a href="http://www.growersfertilizer.com/">http://www.growersfertilizer.com/</a> <a href="mailto:jsmith@growersfertilizer.com">jsmith@growersfertilizer.com</a></p> <p>2. Watson C&amp;D, 12890 NE SR 24 Archer, FL 32618, 352-495-9948, Mr. Jim Bacon's cell is 352-538-6015; <a href="mailto:jim@watsoncll.com">jim@watsoncll.com</a> <a href="http://www.watsoncll.com/">http://www.watsoncll.com/</a></p> <p>3. The Green House Nursery, 15207 W Newberry Road, Newberry, FL 32669, 352-472-3699. Mr. Justin Green, <a href="mailto:ghnursery@gmail.com">ghnursery@gmail.com</a>; <a href="http://www.thegreenhousenurseryfl.com/">http://www.thegreenhousenurseryfl.com/</a></p> <p>4. Hodge Farms, (352)472-6860, Mark Hodge. 20604 SW 30 Ave, Newberry, FL 32669</p>	EHS, DL
2					
	Tu-2	7/7	LEC  GP2	Essential elements READ: Paper 1 for Thursday Selection of EDIS topic finalized	EHS
	Tu-3	7/7	LEC	Controlled Release Fertilizers	EHS
	Th-1	7/9	DISC 1	Discuss Paper 1	Students
	Th-2	7/9	LEC	N/Fe metabolism	Rebecca Darnell
	Th-3	7/9	LEC	Irrigation schedules	Lincoln Zotarelli
3					
	Tu-2	7/14	LEC GP1	Nutrient management in organic production Table of essential nutrients (Due in class)	Danielle Treadwell
	Tu-3	7/14	LEC	Nutrient management plans (I) READ: Paper 2 for Thursday	EHS/DL

	Th-1	7/16	LEC GP2	Nutrient management plans (II) EDIS draft 1 due in class	EHS/DL DL
	Th-2	7/16	DISC 2	Discuss Paper 2	Students
	Th-3	7/16	LEC	Soil testing and plant analyses	EHS
4	THEME II: Advanced topics in plant nutrition				
	Tu-2	7/21	LEC	Instruments for nutrient analyses (I) READ: Paper 3 for Thursday	EHS
	Tu-3	7/21	LEC	Instruments for nutrient analyses (II)	EHS
	We-2	7/22	LEC	Composting (I)	Monica Ozores- Hampton
	We-3	7/22	LEC	Composting (II)	M O-H
	Th-1	7/23	DISC 3 GP2	Discuss Paper 3 EDIS draft 1 edited –returned to students	Students DL
	Th-2	7/23	LEC	Nutrient management research (I)	EHS
	Th-3	7/23	LEC	Nutrient management research (II) READ: Paper 4 for Wednesday	EHS
5					
	Tu-2	7/28	LEC	Chelates READ: Paper 5 for Thursday	DL
	Tu-3	7/28	LEC	Grafting effect on nutrient management	Xin Zhao
	We-1	7/29	DISC 4 GP2	Discuss Paper 4 EDIS final version due	Students DL
	We-2	7/29	LEC	BMPs, TMDLs and BMAP	Darrell Smith
	We-3	7/29	LEC	Q&A	EHS/DL
	Th-1	7/30	DISC 5	Discuss Paper 5	Students
	Th-2	7/30	LEC	Genetics of Plant Nutrition	Eduardo Vallejos
	Th-3	7/30	LEC	Class debriefing/ Q&A	EHS/DL
	Fr-1	7/31	FINAL	Final	EHS/DL
	Fr-2	7/31	FINAL		
6					
		8/4		ASHS Meeting	
		8/5		ASHS Meeting	
		8/6		ASHS Meeting	
		8/7		ASHS Meeting	
	Mo	8/10	Noon	Final grades due	EHS

### A - In-class paper discussions:

Between week 2 and 5, the class will be discussing a selected published paper. The objective of this activity is to (1) gain knowledge on selected topics, (2) gain experience in critical thinking, and (3) learn how to express and share different views and opinions on a scientific subject. Students should read the

papers and use/adapt the following template for paper reading, note taking, discussion leading and participation:

- 1- Read each paper ahead of time
- 2- Note the title, objectives and conclusions: are they lined up?
- 3- Summarize the methodology used: what is written and what information is missing?
- 4- What are the main scientific findings? What makes this work trustworthy?
- 5- Provide an overall rating of the paper
- 6- Prepare 1 question about the paper to share with the class.

**Resource:**

How to review a manuscript? <http://www.ajronline.org/doi/full/10.2214/AJR.05.0782>

**Selected papers for 2015:**

Paper 1 (wk2):

1.2 Progress in nutrition of Florida vegetables in the last 100 years, S.J. Locascio (1987):  
[http://fshs.org/proceedings-o/1987-vol-100/398-405\(Locascio\).pdf](http://fshs.org/proceedings-o/1987-vol-100/398-405(Locascio).pdf)

Paper 2 (wk3):

2.1 Fertilization demonstrations for the tri-county potato production area of Northeast Florida (1993)  
Proc. Fla. State Hort. Soc. 106:190-198.  
[http://fshs.org/proceedings-o/1993-vol-106/190-198%20\(HOCHMUTH\).pdf](http://fshs.org/proceedings-o/1993-vol-106/190-198%20(HOCHMUTH).pdf)

Paper 3 (wk4):

Simonne, E., A. Gazula, R. Hochmuth, and J. DeValerio. 2014. Water movement in drip irrigated sandy soils, pp. 183-210; In: M. Goyal (Ed.) Microirrigation: Research Advances and Applications, Vol. 2: Research Advances and Applications in Subsurface Micro Irrigation and Surface Micro Irrigation. Apple Academic Press Inc., Waretown, NJ.

Paper 4 (wk5):

4.1 Leita, L., M. DeNobili, C. Mondini, G. Muhlbachova, L. Marchiol, G. Bragato, and M. Contin. 1999. Influence of inorganic and organic fertilization on soil microbial biomass, metabolic quotient and heavy metal availability. Biol. Fertil. Soils 28:371-376.  
<http://link.springer.com/content/pdf/10.1007%2Fs003740050506.pdf>

Paper 5 (wk6):

Mori, M., I. Di Mola, and F. Quaglietta Chiaranda. 2011. Salt stress and transplant time in snap bean: growth and productive behavior. Intl. J. Plant Prod. 5(1):1735-6814.

## **A Systematic Guide to Reviewing a Manuscript**

### **Before Writing the Review**

To which manuscript category does this manuscript best conform?

Are there any potential biases in reviewing this manuscript?

Does the manuscript address an important problem?

Has the manuscript been previously published?

### **The Abstract**

Does the Abstract appropriately summarize the manuscript?

Are there discrepancies between the Abstract and the remainder of the manuscript?

Can the Abstract be understood without reading the manuscript?

### **The Introduction**

Is the Introduction concise?

Is the purpose of the study clearly defined?

Do the authors provide a rationale for performing the study based on a review of the medical literature?

If so, is it of the appropriate length?

Do the authors define terms used in the remainder of the manuscript?

If this manuscript is Original Research, is there a well-defined hypothesis?

### **The Methods Section**

Could another investigator reproduce the study using the methods as outlined or are the methods unclear?

Do the authors justify any choices available to them in their study design (e.g., choices of imaging techniques, analytic tools, or statistical methods)?

If the authors have stated a hypothesis, have they designed methods that could reasonably allow their hypothesis to be tested?

### **The Results Section**

Are the results clearly explained?

Does the order of presentation of the results parallel the order of presentation of the methods?

Are the results reasonable and expected, or are they unexpected?

Are there results that are introduced that are not preceded by an appropriate discussion in the Methods section?

### **The Discussion Section**

Is the discussion concise? If not, how should it be shortened?

If a hypothesis was proposed, do the authors state whether it was verified or falsified? Alternatively, if no hypothesis was proposed, do the authors state whether their research question was answered?

Are the authors' conclusions justified by the results found in the study?

If there are unexpected results, do the authors adequately account for them?

Do the authors note limitations of the study? Are there additional limitations that should be noted?

### **Figures and Graphs**

Are the figures and graphs appropriate and are they appropriately labeled? Would a different figure better illustrate the findings?

Do the figures and graphs adequately show the important results?

Do arrows need to be added to depict important or subtle findings?

Do the figure legends provide a clear explanation that allows the figures and graphs to be understood without referring to the remainder of the manuscript?

### **Tables**

If there are tables, do they appropriately describe the results? Should one or more tables be added?

### **The References Section**

Does the reference list follow the format for the journal?

Does the reference list contain errors?

Have the authors appropriately represented the salient points in the articles in the reference list?

Alternatively, have the authors misquoted the references?

Are there important references that are not mentioned that should be noted?

Are there more references than are necessary?

### **Summary Opinion**

The reviewer should provide a short paragraph that summarizes the strengths and weaknesses of the manuscript. The actual Recommendation (e.g., recommend to Accept, Accept Pending Revisions, Reconsider After Major Revisions, or Reject) should not be stated in this paragraph, which is sent to the authors, but should be indicated separately in the drop-down list. It may also be stated in the separate box called "Confidential Note to the Editor." However, the overall tenor of this paragraph should support the reviewer's recommendation.

**Source:** Systematic Guide to Reviewing a Manuscript; James M. Provenzale and Robert J. Stanley  
<http://www.ajronline.org/doi/full/10.2214/AJR.05.0782>



## **B- Group Projects (GP; take home; groups of 3):**

### GP 1 – Table of essential elements

As we go through lectures and you read articles on essential elements, develop and fill a table with the following titles as the column headings:

Essential element name (symbol)

Form(s) absorbed

Uptake mechanism

Form(s) found in plants

Main functions

Mobility in plant

Mobility in soil

Deficiency symptoms

Fertilizer source

Concentration range in plant

Interactions with other elements

Other as you see needed

### GP 2- EDIS-ready manuscript (groups 2 or 3)

Proposed topics:

1. General topics:

- 1.1 Salinity and plant nutrition
- 1.2 Plant health and susceptibility to disease
- 1.3 Fertilizer/nutrient toxicity
- 1.4 Nutrient management in organic production
- 1.5 Soil testing in organic vegetable production
- 1.6 OMRI

2. Fertilizer products:

- 2.1 Crop health therapy
- 2.2 Foliar supplements and foliar fertilization
- 2.3 Fertilizers for organic production
- 2.4 Other fertilizer products

3. Plans:

- 3.1 How to develop a nutrient management plan
- 3.2 How to develop an irrigation schedule

4. Others:

- 4.1 From your research interests