UNIVERSITY OF FLORIDA

Horticultural Sciences Department

PLS 3800C (25962) Fall 2025 Section 3254
HOS6932 (24883, in Person and 28713, 100% online)

Commercial Vegetable Production

Instructor: Bala Rathinasabapathi, Ph.D.
Room 2247, Fifield Hall
Phone 352-273-4847
Cell: 352-339-4269

Lecture: Tues Periods 8 and 9 (3 pm – 4:55 pm) 1304 Fifield Hall
Lab Thu Periods 8 and 9 (3 pm – 4:55 pm) 1304 Fifield Hall &
Student vegetable gardens, Hull Road, across from Fifield Hall

Office hours: By Appointment; e-mail brath@ufl.edu
Course Homepage: Connect via Canvas

Optional Textbook:

Producing Vegetable Crops by Swiader JM and Ware GW., Interstate Publishers Inc., Danville, Illinois, 5th Edition, 2002. ISBN 0-8134-3203-0.

Other Optional References:

Vegetable Production Handbook For Florida 2023-2024, by Dittmar, PJ, Agehara, S., Dufault, N (Eds.), University of Florida, IFAS Extension. 655 pp. (For a Free download: VPH/CV292: Vegetable Production Handbook of Florida, 2023–2024 edition (ufl.edu)

Articles from Florida Cooperative Extension Service, Journal of the American Society of Horticultural Science, Hortscience and American Vegetable Grower. Available via Canvas.

Objective:
The principles and practices of successful commercial vegetable production will be presented. Crop requirements, growth patterns and production techniques are emphasized along with discussion of consumption/marketing patterns in the U.S. and Florida production areas. The laboratory involves field trips to farming operations and guest lectures from individuals in the vegetable production industry. Each member of the class will also develop a vegetable garden with different crops suitable for Fall production and participate in vegetable crop production activities.

General Syllabus:
Lecture information and laboratory experiences will instruct the student in specific production practices and technology, as well as other important information required to successfully grow

various vegetable crops.

For each grouping, the student will learn:

1. The botanical classification, horticultural types, origin, and history of each crop.
2. The scope and importance of production in the US, including where the crop is grown, commercial acreage, value and average yields.
3. Important aspects of vegetable growth and development, especially in relation to plant response to environmental factors and how they may affect production practices.
4. Specific climatic and cultural requirements of each crop.
5. Methods of planting, plant spacing and populations, and specialized procedures such as seed treatments.
6. Standard and evolving production practices and requirements necessary for successful production.
7. Leading cultivars and their important characteristics and new developments in breeding specific crops.
8. Pests and significant physiological disorders.
9. Harvesting procedures, postharvest handling of crops and food safety issues.

Format:

4-credit course for majors and non-majors. No pre-requisites.

Evaluation:

Students will be evaluated based on the following:

Class attendance & participation	50 points
Lab/activity reports	100 points
Research and demonstration project	100 points
Class presentation	100 points
Tests (3, each 50 points)	150 points
TOTAL	500 points (100%)

* Letter grades for the course will be assigned according to the chart below based on total %:
90-100 = A; 87-89 = A-; 84-86 = B+; 80-83 = B; 77-79 = B-; 74-76 = C+; 70-73 = C; 67-69 C-; 64-66 = D+; 60-63 = D; 57-59 = D-; 56-below = E.

* Class attendance will be marked each day either at the beginning or end or middle of the class period and participation by student comments and questions during the lectures.

Learning Outcomes:

By the completion of this course, the conscientious student should be able to

(1) Describe the nature and botanical properties of major vegetables grown in the United States.
(2) Consult and critically analyze data on the production, consumption, import and export, marketing and economic value of at least five major vegetables.
(3) Explain production details for at least five major vegetables cultivated in Florida.
(4) Diagnose problems related to soil fertility, irrigation and pests of at least five major vegetables.
(5) Find sustainable solutions to problems related to soil fertility, irrigation and pests of major vegetables.
(6) Choose vegetable cultivars suitable for a given region or production system.
(7) Enumerate advantages and disadvantages of various production systems.
(8) Propagate vegetable crops and cultivate a vegetable farm
(9) Estimate the cost of production for major vegetables.

Lab and field trip reports, Written assignment and Class presentations:

(1) Transplant Production (10 points). Each student will generate vegetable transplants of at least 2 vegetable crops. Instructions, seeds and greenhouse space will be provided. Quality of the transplants and a report of this activity will be evaluated. This report should include at least one photo each of (a) seeds, (b) early seedling and (c) the final transplant for two vegetable crops and (d) a description of key factors that influence the quality of the transplants.

(2) Field Production of Vegetables (40 points). The students will cultivate five different vegetable crops as part of their laboratory. The student will keep a field notebook for weekly observations and write a final report for evaluation. The final report should contain information about the crops and their varieties, crop stand, weather, irrigation, soil fertility management, insect pests, diseases and weeds encountered and notes on how the problems were handled, and the quality and quantity of vegetables harvested. Irrigation will be managed by the staff.

(3) Container gardens (20 points). Facilities to set up container gardens of vegetables, greenhouse space, materials and instruction will be provided. Each student will grow different vegetable crops for this exercise. The quality of the crop and the final write up will be evaluated.

(4) Hydroponics (10 points). Facilities to set up hydroponics will be provided. Students will grow a crop of lettuce. This will be a demonstration by the instructor. The students will make observations, and photograph developing plants once a week. Students will submit a final write up at the end of the period.

(5) Field trip report (10 points). This will be a field trip to a farm. Students will take notes and photograph the farm facility and write a report on what they have learned from the trip.

(6) Sprayer Calibration (10 points): Students will fill sprayers with water and calculate the output from the sprayers. They will be given a set of problems to solve on pesticide dilution and application.

(7) Research project (100 points). Students will work as a group on a project focused on purple sweet potatoes. Each student will be responsible for collecting qualitative and quantitative data on different varieties of purple sweet potatoes grown in the teaching garden. We will use a descriptor tool available here:

https://cipotato.org/genebankcip/wp-content/uploads/sites/3/2017/05/Descriptors_for_sweet_potato_Descripteurs_pour_la_patate_douce_Descriptores_de_la_batata_263.pdf

Data collection will follow the instructions in this manual between pages 16 to 34. Each participant will submit a draft report, and feedback will be provided to improve your report prior to final submission for grade.

(8) Class presentation (100 points). Each student will prepare the cost of production analysis for one vegetable crop and make a Power Point presentation about production, cost analysis and expected profits in a 5-acre farm. The grading will be for accurate details, and the clarity of presentation.

Course policies and procedures

(a) During Thursday lab/field sessions, students should bring their own bottled water, sun protection and should wear closed toe-shoes. If there is light rain, students will stay at the breezeway of building 1400 and resume activities when safe. On days when there is heavy rainfall or lightning, the class will NOT continue that day and the students will be updated at the next class meeting about make-up of activities. Make up classes will be arranged based on the most convenient class period for most students in the class.

(b) **Thursday afternoon lab/field meetings**: All the meetings will be in front of building 1400, in the Student Vegetable Garden on Hull Road, across from Fifield Hall, unless instructed otherwise.

(c) Grades and Grade Points: For information on current UF policies for assigning grade points, see https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx.

(d) 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.

Reports are due on the dates indicated in the instructions for each activity. Late homework will be accepted with a 20% penalty for each day after the due date. If you are having trouble with homework or class, please see me immediately. Test makeups will be arranged only in the case of an emergency and not for absences for any other reasons.

(e) Safety: Follow all safety regulations in and out of the classroom. Personal safety is individual responsibility although we will facilitate it in and outside the classroom.

(f) If weather related issues arise such as rain, hurricanes and frost, class activities will be re-arranged on different dates and times considering the duties of both the instructor and the majority of students.

(g) Privacy statements regarding the online part of the course: Though this is a face-to- face class, some opportunities may be provided for students to join virtually. Our class sessions may be 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 agree 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.

(h) 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 weeks of the semester, students will be notified of the specific times when they are open. Summary results of these assessments are available to students at https://evaluations.ufl.edu/results.

(i) 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*".

(j) 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/process/student-conduct-honor-code. Do not use ChatGPT or other AI tools to write your reports unless you are asked to do so. Students need to write in their own words. Information about avoiding plagiarism can be found at the University of Florida library website https://guides.uflib.ufl.edu/copyright/plagiarism

(k) 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.

(l) Services for Students with Disabilities: The Disability Resource Center coordinates the accommodation needed 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: https://disability.ufl.edu

(m) 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. 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 and wellbeing coaching. U Matter We Care, www.umatter.ufl.edu/
Career Resource Center, First Floor JWRU, 392-1601 https://career.ufl.edu

Schedule:

Module 1 – Nature and properties of major vegetable crops, statistics on production, import – export and marketing of major vegetables. (Weeks 1 -3)
Module level objectives:

(a) At the end of this module be able to identify major vegetable crops, their role in human nutrition, and their botanical properties, and production statistics in the United States.
(b) Be able to articulate the production zones and seasons in different parts of Florida.
(c) Be able to identify resources for vegetable production related information
(d) Learn the skills related to beginning a production unit.

Week 1

21 Aug 2025 Thu Introduction, Syllabus, Guidelines and Canvas resources.
How to document observations to be used in activity reports, Phone photos and measurements.

Week 2

26 Aug 2025 Tues Importance of Vegetables & Major vegetables
27 Aug 2025 Wed *Last day for Drop/Add*
28 Aug 2024 Thu Use of Vegetables – Warm up activity

Week 3

1 Sep 2025 Mon *Labor Day holiday*
2 Sep 2025 Tue Vegetable Seed Sources & Transplant Production
4 Sep 2025 Thu Lab 1 Vegetable Seed Sources

Module 2 –Sustainability in production, Role of vegetable crop breeding, and Genetically modified crops. (Weeks 4-7)
Module level objectives:

(a) Explain elements of sustainability in vegetable production, marketing and use.
(b) Be able to define and distinctions between terms 'species', 'variety', 'cultivar', 'inbred', 'hybrid' and GMO, 'transgenic crop' and 'gene-edited crop'.
(c) Learn the skills related to transplant production, produce vegetable transplants and write a report.

Week 4

9 Sep 2025 Tue Sustainable production of vegetables.
11 Sep 2025 Thu Project-based learning. How Plant Breeding efforts are intertwined with studies on optimized production.
Lab 2 Transplant Production

Week 5

16 Sep 2025 Tue Vegetable production in Alachua County – Production cycles
18 Sep 2025 Thu Row crops – bed formation, tillage and spacing
Lab 3a. Planting a Fall Vegetable Garden I

Week 6

23 Sep 2025 Tue	Details of the research project on Purple Sweet Potatoes
25 Sep 2025 Thu	Lab 3b. Planting a Fall Vegetable Garden II

Week 7

30 Sep 2025 Tue	GM Vegetable crops
02 Oct 2025 Thu	Plant Nutrition and Lab 4. Setting up container gardens of Kale
	Lab 5a. Weeding, fertilizer application and pest control

Module 3 – Organic matter, soil properties and fertility (Weeks 8-10)

Module level objectives:

(a) Describe the required nutrient elements for crop growth and their deficiency symptoms.
(b) Identify different chemical and organic fertilizers used in vegetable crop production.
(c) Learn the skills related to setting up of hydroponic vegetable production.
(d) Learn the skills related to sampling soil for a soil test and interpretation of soil test results.

Week 8

07 Oct 2025 Tue	Plant Nutrition and Hydroponics
09 Oct 2025 Thu	Lab 5b. Weeding, fertilizer application and pest control cond.
	Lab 6. Setting up the hydroponics

Week 9

14 Oct 2025 Tue	Soils and soil fertility management
16 Oct 2024 Thu	Calculation of fertilizer requirements for crops.
	Lab 7. Sampling of soil for a soil test.
17 Oct 2025 Fri	*Homecoming*

Week 10

21 Oct 2025 Tue	Mulching
23 Oct 2025 Thu	Irrigation
	Lab 8. Fertigation of Drip-Irrigated Vegetables

Module 4 – Vegetable crop insect pests, diseases and weeds (Weeks 8-12)

Module level objectives:

(a) Be able to identify at least 5 insect pests, 5 diseases and 5 weeds affecting major vegetable crops of Florida.
(b) Describe at least 6 methods to manage insect pests in vegetable crops.
(c) Describe at least 6 methods to manage diseases in vegetable crops.
(d) Describe at least 6 methods to manage weeds in vegetable crops.
(e) Describe mode of action for pesticides used on vegetable crops.
(f) Acquire skills related to safe handling of pesticides.

Week 11

28 Oct 2025 Tue	Insect pests on vegetable crops
30 Oct 2025 Thu	Insecticides and their mode of action
	Lab 9. Calibration of a knapsack sprayer.

Week 12

04 Nov 2025	Diseases of vegetable crops
06 Nov 2025	Management of vegetable diseases.
	Lab 10. Harvesting vegetables and estimating yield per acre from harvests from small plots.

Module 5 – Vegetable crop insect pests, diseases and weeds (Weeks 13-14)

Module level objectives:

(a) Be able to draw a business plan with a cost of production analysis for one vegetable crop for production in Florida.

(b) Make calculations related to the profitability of producing your chosen crop and make a presentation to your peers.

Week 13

11 Nov 2025, Tue – *Veteran's Day Holiday - No class*

13 Nov 2025 Thu	Weeds and herbicides, Garden clean up and Tips for Cost of Production calculations

Week 14

18 Nov 2025, Tue	Student Presentations
20 Nov 2025, Thu	Student Presentations
	Course Evaluations will open on 26 Nov 2024.

Week 15

25 Nov 2025 Tue – *No class. Thanksgiving*

27 Nov 2025 Thu – *No class. Thanksgiving*

Week 16

02 Dec 2025 Tue	Student Presentations

03 Dec 2025 Wed – *No class. Last day of class for the semester.*
