

# Cover Sheet: Request 13001

## HOS 4XXXC Principles of Postharvest Horticulture

### Info

Process	Course New Ugrad/Pro
Status	Pending at PV - University Curriculum Committee (UCC)
Submitter	Gerardo Nunez Villegas g.nunez@ufl.edu
Created	9/5/2018 3:41:52 PM
Updated	12/27/2018 11:41:39 AM
Description of request	We request to create a new course titled HOS 4XXX C – Principles of Postharvest Horticulture

### Actions

Step	Status	Group	User	Comment	Updated
Department	Approved	CALS - Horticultural Sciences 514923000	Christine Chase		9/5/2018
No document changes					
College	Recycled	CALS - College of Agricultural and Life Sciences	Joel H Brendemuhl	Recycled by the CALS CC on 9/14/18.	9/21/2018
No document changes					
Department	Approved	CALS - Horticultural Sciences 514923000	Christine Chase		9/21/2018
No document changes					
College	Recycled	CALS - College of Agricultural and Life Sciences	Joel H Brendemuhl	Department approved prior to corrections being made and thus it is being recycled again.	9/24/2018
No document changes					
Department	Approved	CALS - Horticultural Sciences 514923000	Christine Chase		9/24/2018
No document changes					
College	Recycled	CALS - College of Agricultural and Life Sciences	Joel H Brendemuhl	Approved in error.	9/24/2018
No document changes					
Department	Approved	CALS - Horticultural Sciences 514923000	Christine Chase		10/3/2018
Support letter HOS4XXXC - Principles of Postharvest Horticulture.pdf					10/3/2018
College	Approved	CALS - College of Agricultural and Life Sciences	Joel H Brendemuhl	Edits and revisions requested by the CALS CC have been addressed.	11/13/2018
Syllabus - HOS 4XXXC - Principles of Postharvest Horticulture - After CALS CC 2.pdf					10/30/2018
University Curriculum Committee	Commented	PV - University Curriculum Committee (UCC)	Lee Morrison	Added to December agenda.	12/10/2018

Step	Status	Group	User	Comment	Updated
No document changes					
University Curriculum Committee	Tabled	PV - University Curriculum Committee (UCC)	Casey Griffith	Tabled until submitter has time to respond to UCC review subcommittee	12/27/2018
No document changes					
University Curriculum Committee	Pending	PV - University Curriculum Committee (UCC)			12/27/2018
No document changes					
Statewide Course Numbering System					
No document changes					
Office of the Registrar					
No document changes					
Student Academic Support System					
No document changes					
Catalog					
No document changes					
College Notified					
No document changes					

## Course|New for request 13001

### Info

**Request:** HOS 4XXXC Principles of Postharvest Horticulture

**Description of request:** We request to create a new course titled HOS 4XXX C – Principles of Postharvest Horticulture

**Submitter:** Gerardo Nunez Villegas g.nunez@ufl.edu

**Created:** 10/30/2018 10:14:58 AM

**Form version:** 3

### Responses

**Recommended Prefix** HOS

**Course Level** 4

**Number** XXX

**Category of Instruction** Advanced

**Lab Code** C

**Course Title** Principles of Postharvest Horticulture

**Transcript Title** Postharvest Hort

**Degree Type** Baccalaureate

**Delivery Method(s)** Online

**Co-Listing** No

**Co-Listing Explanation** Not applicable

**Effective Term** Earliest Available

**Effective Year** Earliest Available

**Rotating Topic?** No

**Repeatable Credit?** No

**Amount of Credit** 3

**S/U Only?** No

**Contact Type** Regularly Scheduled

**Weekly Contact Hours** 3

**Course Description** Biological principles involved in harvesting, grading, packaging, transportation, and marketing horticultural crops, and their effects on quality maintenance. Commercial postharvest practices explained in relation to general procedures and technologies as well as the recommended postharvest best handling practices and optimum postharvest conditions for different types of horticultural crops.

**Prerequisites** HOS4304

**Co-requisites** None

**Rationale and Placement in Curriculum** Horticulture does not end at harvest. Postharvest horticulture is an important aspect of horticultural production quality and efficiency.

This course will be required in the Organic Horticultural Systems and Science and Technology of Horticultural Crops specializations (BS in Horticultural Sciences). Additionally, this course will be an elective in the Plant Biotechnology and Improvement specialization (BS in Horticultural Sciences).

**Course Objectives** Upon completion of the course, students will be prepared to,

1. Recognize the factors related to quality deterioration and wastage of horticultural commodities after harvest, including physiological, biochemical, and pathological considerations, as well as compositional and physical changes occurring during maturation and deterioration.
2. Relate commercial procedures for harvesting, preparation, packaging, transportation, and storage of horticultural crops to the biological principles and individual commodity requirements and responses.
3. Evaluate postharvest handling systems and recommend improved practices that will better maintain product quality during the postharvest period.

**Course Textbook(s) and/or Other Assigned Reading** No textbook is required for the course. However, the following supplemental reading sources may be helpful during this course.

- Postharvest: An Introduction to the Physiology and Handling of Fruit and Vegetables 6th

edition, 2016, by R. B. H. Wills et al. (CAB International, New York).

- Postharvest technology of horticultural crops, 3rd edition, 2002, edited by A. A. Kader (Coop. Ext., Univ. of Calif. Div. Nat. Res., Berkeley, CA).
- Postharvest physiology and pathology of vegetables. 2nd edition, 2003, edited by J.A. Bartz and J.K. Brecht (Marcel Dekker, Inc., New York)
- Postharvest biology. 2004, S.J. Kays and R.E. Paul (Exon Press, Athens, GA).
- Postharvest Handling. A Systems Approach, 3rd edition, 2014, edited by W.J. Florkowski, R.L. Shewfelt, B. Brueckner, and S.E. Prussia (Academic Press, San Diego)

### **Weekly Schedule of Topics** Week 1

Introduction - Postharvest deterioration and losses

Morphology, structure, growth and development

Week 2

Composition of horticultural crops

Compositional changes during maturation & ripening

Week 3

Ethylene & other plant hormones - role in senescence

Ethylene and fruit ripening

Week 4

Respiration - introduction, measurement

Respiration - internal and environmental factors

Week 5

Transpiration & water loss

Physiological disorders

Week 6

Postharvest pathology - host-parasite interactions

Postharv. pathol. - environmental factors & control

Week 7

Maturity and quality standards

Food safety & quarantine treatments

Week 8

Harvesting, handling and packinghouse operations

Temp. management - cooling methods & principles

Week 9

Commercial storage; modified & controlled atmospheres

Transportation & the distribution system

Week 10

Subtropical fruits

Tropical fruits

Week 11

Small fruits

Pome & Stone fruits

Week 12

Vegetables – leafy & succulent

Vegetables – storage organs

Week 13

Vegetables – immature & mature fruits

Fresh-cut vegetables & fruits

Week 14

Cut flowers & potted plants

Week 15

Review and Final Exam

### **Links and Policies** COURSE POLICIES

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

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

### Attendance and Make-up Policy

Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found at:

- UF Attendance policy, <https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>

### 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."

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>

#### 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.

#### Services for Students with Disabilities

Students with disabilities requesting accommodations should first register with the Disability Resource Center by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

- Disability Resource Center, 0001 Reid Hall, (352) 392-8565, [www.dso.ufl.edu/drc/](http://www.dso.ufl.edu/drc/)

#### 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.

- Counseling and Wellness Center, 3190 Radio Road, 392-1575, [www.counseling.ufl.edu](http://www.counseling.ufl.edu)  
Counseling Services

#### Groups and Workshops

#### Outreach and Consultation

#### Self-Help Library

#### Wellness Coaching

- U Matter We Care, [www.umatter.ufl.edu](http://www.umatter.ufl.edu)
- Sexual Assault Recovery Services (SARS), Student Health Care Center, 392-1161.
- University Police Department, 392-1111 (or 9-1-1 for emergencies), [www.police.ufl.edu](http://www.police.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, <https://career.ufl.edu/>

#### Course Evaluation Process

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. Summary results of these assessments are available to students at:

- Evaluations summary, [www.evaluations.ufl.edu/results](http://www.evaluations.ufl.edu/results)

#### Student Complaints

You can file and resolve any complaints about your experience in this course in the following site:  
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<b>Grading Scheme</b>	1. Midterm 1		100 points
	2. Midterm 2	100 points	
	3. Final Exam	200 points	
	4. Laboratory reports	100 points	
Total		500 points	

Exams will be open book with 1 week to complete.

Students will conduct laboratory exercises during the semester and create PowerPoint reports for other students to view. Detailed instructions for the laboratory exercises will be distributed separately.

#### GRADING SCALE

A (4.0)

= 470 - 500 points  
A- (3.67)

= 450 - <470 points  
B+ (3.33)

= 435 - <450 points  
B (3.0)

= 415 - <435 points  
B- (2.67)

= 400 - <415 points  
C+ (2.33)

= 385 - <400 points  
C (2.0)

= 365 - <385 points  
C- (1.67)

= 350 - <365 points  
D+ (1.33)

= 335 - <350 points  
D (1.0)

= 315 - <335 points  
D- (0.67)

= 300 - <315 points  
E (0)

=

< 300 points

**Instructor(s)** Jeffrey K. Brecht  
Mark Ritenour

Institute of Food and Agricultural Sciences  
Horticultural Sciences Department

1113 Fifield Hall  
PO Box 110690  
Gainesville, FL 32611-0690  
352-273-4765  
352-392-6479 Fax

Dear colleagues in the CALS Curriculum Committee,

We request to create a new undergraduate course titled *Principles of Postharvest Horticulture*. This course will focus on biological phenomena that affect horticultural crops after harvest. While the title is shared with our existing graduate course (HOS 5085C), the graduate and undergraduate courses will not be co-listed. Each course, will have different pre-recorded lectures and assignments.

Please, do not hesitate to contact us if we can furnish you with additional information.

Sincerely,



Dr. Jeffrey K. Brecht



Dr. Mark Ritenour

Instructors – *Principles of Postharvest Horticulture*



## HOS 4XXX C – Principles of Postharvest Horticulture

3 CREDITS

### MEETING TIMES AND LOCATION

Students view web-based lecture and demonstration materials and participate in a weekly discussion session (day/time TBD) conducted either in-person or by videoconferencing according to student needs.

### INSTRUCTORS

**Dr. Jeffrey K. Brecht**

1217 Fifield Hall

(352) 273-4778

[jkbrecht@ufl.edu](mailto:jkbrecht@ufl.edu)

**Dr. Mark Ritenour**

IRREC – Ft. Pierce

(772) 201-5548

[ritenour@ufl.edu](mailto:ritenour@ufl.edu)

Office hours Mondays 3:00PM- 5:00PM, but students are encouraged to contact instructors via e-mail or phone outside of office hours whenever questions are encountered.

### PRE-REQUISITES

HOS 4304 – Horticultural Physiology

### COURSE DESCRIPTION

Biological principles involved in harvesting, grading, packaging, transportation, and marketing horticultural crops, and their effects on quality maintenance. Commercial postharvest practices explained in relation to general procedures and technologies as well as the recommended postharvest best handling practices and optimum postharvest conditions for different types of horticultural crops.

### LEARNING OBJECTIVES

Upon completion of the course, students will be prepared to,

1. Recognize the factors related to quality deterioration and wastage of horticultural commodities after harvest, including physiological, biochemical, and pathological considerations, as well as compositional and physical changes occurring during maturation and deterioration.
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## COURSE GRADE

1. Midterm 1	100 points
2. Midterm 2	100 points
3. Final Exam	200 points
4. <u>Laboratory reports</u>	<u>100 points</u>
<b>Total</b>	<b>500 points</b>

Exams will be open book with 1 week to complete.

Students will conduct laboratory exercises during the semester and create PowerPoint reports for other students to view. Detailed instructions for the laboratory exercises will be distributed separately.

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A (4.0) = 470 - 500 points	C (2.0) = 365 - <385 points
A- (3.67) = 450 - <470 points	C- (1.67) = 350 - <365 points
B+ (3.33) = 435 - <450 points	D+ (1.33) = 335 - <350 points
B (3.0) = 415 - <435 points	D (1.0) = 315 - <335 points
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## COURSE MATERIALS

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**HOS4XXXC**  
**PRINCIPLES OF POSTHARVEST HORTICULTURE**  
**Course Schedule**

<b>Lec. #</b>	<b>Instr.</b>	<b>Lecture Topic</b>	<b>Supplemental Reading</b>
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**I. BIOLOGICAL CONSIDERATIONS**

1	MAR	Introduction - Postharvest deterioration and losses	Kader Ch. 4; Wills Ch. 1
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2	JKB	Morphology, structure, growth and development	Wills Ch. 2
<b>Discussion date #1:</b> (Lec. 1-2) Date TBD - Week 1			Kays & Paull Ch. 2

3	JKB	Composition of horticultural crops	Florkowski Ch. 5
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4	JKB	Compositional changes during maturation & ripening	Wills Ch. 3 &
<b>Discussion date #2:</b> (Lec. 3-4) Date TBD - Week 2			

5	JKB	Ethylene & other plant hormones - role in senescence	Bartz & Brecht Ch. 3
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6	JKB	Ethylene and fruit ripening	Bartz & Brecht Ch. 10
<b>Discussion date #3:</b> (Lec. 5-6) Date TBD - Week 3			

7	MAR	Respiration - introduction, measurement	Bartz & Brecht Ch. 2
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8	MAR	Respiration - internal and environmental factors	Kays & Paull Ch. 3
<b>Discussion date #4:</b> (Lec. 7-8) Date TBD - Week 4			Kays & Paull Ch. 4

9	MAR	Transpiration & water loss	Bartz & Brecht Ch. 5
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10	JKB	Physiological disorders	Wills Ch. 8
<b>Discussion date #5:</b> (Lec. 9-10) Date TBD - Week 5			Bartz & Brecht Ch. 19

**MIDTERM EXAM - through physiological disorders (lectures 1-10)**

**Posting date:** Friday of Week 5; **Due date:** Friday of Week 6

11	Bartz	Postharvest pathology - host-parasite interactions	Bartz & Brecht Ch. 24
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12	Bartz	Postharv. pathol. - environmental factors & control	Bartz & Brecht Ch. 20-23
<b>Discussion date #6:</b> (Lec. 11-12) Date TBD - Week 6			

**II. COMMERCIAL PRACTICES**

13	JKB	Maturity and quality standards	Florkowski Ch. 8 & 14, Kader Ch. 6 & 23
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14	MAR	Food safety & quarantine treatments	Kader Ch. 19 & 24
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**Discussion date #7:** (Lec. 13-14) Date TBD - Week 7

15 MAR Harvesting, handling and packinghouse operations Bartz & Brecht Ch. 16

16 MAR Temp. management - cooling methods & principles Bartz & Brecht Ch. 8

**Discussion date #8:** (Lec. 15-16) Date TBD - Week 8  
Bartz & Brecht Ch. 9  
Kader Ch. 11

17 JKB Commercial storage; modified & controlled atmospheres Wills Ch. 6&7

18 MAR Transportation & the distribution system Kader Ch. 20  
Florkowski Ch. 16

**Discussion date #9:** (Lec. 17-18) Date TBD - Week 9

**MIDTERM EXAM – Postharvest pathology through distribution and marketing (lectures 11-18)**

**Posting date:** Friday of Week 9; **Due date:** Friday of Week 10

### III. COMMODITY REQUIREMENTS

19 MAR Subtropical fruits Kader Ch. 30

20 JKB Tropical fruits Kader Ch. 31

**Discussion date #10:** (Lec. 19-20) Date TBD - Week 10

21 MAR Small fruits Kader Ch. 29

22 JKB Pome & Stone fruits Kader Ch. 27-28

**Discussion date #11:** (Lec. 21-22) Date TBD - Week 11  
Kader Ch. 34

23 JKB Vegetables – leafy & succulent Bartz & Brecht Ch. 25

24 JKB Vegetables – storage organs Bartz & Brecht Ch. 26

Kader Ch. 35

**Discussion date #12:** (Lec. 23-24) Date TBD - Week 12  
Kader Ch. 33

25 JKB Vegetables – immature & mature fruits Bartz & Brecht Ch. 27-28

26 JKB Fresh-cut vegetables & fruits Bartz & Brecht Ch. 29

Kader Ch. 36

**Discussion date #13:** (Lec. 25-26) Date TBD - Week 13

27 MAR Cut flowers & potted plants Kader Ch. 25

**Discussion date #14:** (Lec. 27) Date TBD - Week 14

**Review Session:** 12/4. Final Exam distributed afterwards, due 1 week later.

**December X** – Last Day of Classes

**Dec. X & Y** – Reading Days

**FINAL EXAM** – Cumulative (50%), but focusing on lectures 19–27 (50%)

**Posting date:** Last class meeting; **Due date:** 1 week later

**HOS 4XXXC**  
**PRINCIPLES OF POSTHARVEST HORTICULTURE**  
**Laboratory Schedule**

<b>Lab. #</b>	<b>Periods</b>	<b>Laboratory Topic</b>
1.	1	Introduction - tour of postharvest laboratory facilities; methods for measuring respiration and ethylene; quality evaluation systems.
2.	4	Factors affecting respiration, ethylene production and deterioration: <ol style="list-style-type: none"><li>1. Commodity type</li><li>2. Time and temperature</li><li>3. Modified/controlled atmospheres</li><li>4. Ethylene</li><li>5. Physical damage</li></ol>
3.	2	Factors affecting transpiration and water loss: <ol style="list-style-type: none"><li>1. Water vapor pressure difference</li><li>2. Air velocity</li><li>3. Product surface to volume ratio and surface properties</li><li>4. Water vapor barriers (films and coatings)</li></ol>
4.	1	USDA grade standards
5.	2	Physiological disorders: <ol style="list-style-type: none"><li>1. Low temperature (chilling) injury</li><li>2. High temperature injury</li></ol>
6.	2	Pathological considerations: <ol style="list-style-type: none"><li>1. Physiological state of the commodity</li><li>2. Temperature and moisture</li><li>3. Surface barriers</li><li>4. Chemical control</li></ol>
7.	1	Field trip to observe harvesting, packinghouse, storage and transport operations.
8.	1	Field trip to a wholesale produce distribution center.