HRT 323: Floriculture Production: Herbaceous Perennials and Annuals

Department of Horticulture
Michigan State University
Spring Semester, 2026

Part I. Course Information

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Lecture and Lab Location
Lecture & Lab in B109 Plant & Soil Science Bldg. and Greenhouses D104, C103 and C104
Tuesday: 3:00 to 4:50 PM
Friday: 12:40 to 3:30 PM + 1 hour arranged as needed

Course Communication

As the instructor for HRT 323, I am here to answer your questions to ensure you meet the outlined learning goals by the completion of the course. I do not have scheduled office hours, but meeting times may be arranged by making an appointment. Please review the many communication options below to ensure that our interactions are efficient for all parties.

- The best way to reach me outside of class is by sending me an e-mail. Please email me at rglopez@msu.edu or through the D2L email option (both will go to the same mailbox). I will respond to whichever email you use, so be sure to check that same mailbox.
    - Allow me at least 24 hours (48 on the weekends) to respond. I will likely be checking my email more frequently, but allow this much time before projects and exams are due.
    - I will email the class from the D2L website, which automatically goes to your D2L mailbox. If you have not already, consider adding a forwarding email address in the settings of your D2L email account to ensure you receive all correspondence.
    - Professional email etiquette is expected. For more information on what that means, please visit the article, "The Do's and Don'ts of Email Etiquette." (https://www.entrepreneur.com/article/272780)
- I strongly encourage you to ask questions at any time and not wait until the day before the exam.
- Many students don't know how to address their professors or instructors. You may call me by my first name (Roberto) or Dr. Lopez. You may choose whichever is most comfortable.

Course Prerequisites

It is expected that students enrolled in this course will have successfully completed HRT 203 (Principles of Horticulture), HRT 204 (Plant Propagation), or concurrently, HRT 221 (Greenhouse Structures and Management) at MSU, or a similar course at another institution. Students will need to be familiar with the basic concepts of greenhouse crop culture, including environment (light, temperature, and atmosphere) and culture (irrigation water, fertilizer, and plant growth regulators).

Course Description

This course will cover the production of potted floriculture crops. Topics will include commercial greenhouse production of Easter lilies and Dutch bulbs, herbaceous perennials, annuals, and other plants typically sold in retail garden centers for outdoor gardening. Plant identification, propagation, production, scheduling, and finishing procedures based on specific plant growth requirements will be covered. Plant selection, marketing, and retailing issues will also be discussed. We will be applying the skills and knowledge from HRT 221 (Greenhouse Structures and Management) to the production of specific crops throughout the semester.

Course Textbooks, Podcasts, e-GRO alerts, and Materials

The recommended textbooks for this course can be purchased from online retailers, the MSU Spartan Bookstore in the International Center, or any of the East

Lansing bookstores. To be successful in this course, complete readings and listen to podcasts prior to the lecture. You will derive greater value from lectures if you have already familiarized yourself with the topic and can listen with some prior knowledge. Reading and listening to podcasts before class will also help you identify areas that need clarification and allow you to ask more specific questions.

- ***Required*** *- if you intend to be a commercial floriculture grower, you should buy this book.*
  FREE ONLINE DOWNLOAD:
  Ball Redbook, vol. 1 – Greenhouse structures, equipment, and technology 2021. Ball Redbook, vol. 2 – Crop Production. 2021. Jim Nau, Bill Calkins, and Allison Westbrook. Ball Publishing, West Chicago, IL.
- ***Required handouts and other course materials:*** Some course materials will be available online through the course management system (D2L) at: http://d2l.msu.edu
- ***Recommended*** *- if you intend to be a commercial grower, you will want to keep these books*
  FREE ONLINE DOWNLOAD:
  Achieving Sustainable Cultivation of Ornamental Plants 2020. Edited by Michael Reid, Burleigh. *Dodds Science Publishing Limited*, Cambridge, United Kingdom.
  Floriculture- Principles and Species, 2nd ed. 2005.

  John M. Dole and Harold F. Wilkins. Pearson/Prentice Hall, Upper Saddle River, NJ.
- ***Recommended podcasts:*** Prerecorded podcasts covering some course topics are available online on the Electronic Growers Resources Online (e-GRO) website: *http://e-gro.org/university.php*

Part II. Course Goals and Objectives

Course Goals

Upon completion of HRT 323, students will be able to synthesize production information and techniques, utilize secondary literature, and produce annual bedding plants, herbaceous perennials, Dutch bulbs, and Easter lilies.

Course Objectives

After completing this course, students will be able to:

- Describe the scope of the floriculture industry;
- Demonstrate the knowledge and practice of greenhouse production of potted plants, annual and perennial bedding plants on quizzes and exams;
- Summarize primary and secondary literature and synthesize important messages that inform current and modern greenhouse crop production practices;
- Execute plant maintenance and produce flowering annual and perennial bedding plant crops through the finishing (flowering) stage;
- Develop and implement greenhouse floral crop production schedules;
- Understand issues and techniques involved with producing standard flowering pot crops and bedding plants;
- Determine appropriate post-harvest handling techniques for various floral crop species;

- Systematically diagnose insect, disease, and abiotic problems and then develop and implement appropriate control measures;
- Understand basic marketing practices used to sell floral crop species;
- Determine cost and profitability for multiple production systems.

Desired Learning Outcomes

- Ability to demonstrate the knowledge and practice of greenhouse production of annual and perennial bedding plants, and Easter lilies;
- Ability to summarize primary and secondary literature (ie. Extension bulletins and trade articles) and synthesize important messages that inform current and modern greenhouse crop production practices;
- Ability to execute plant maintenance and produce high-quality flowering spring floriculture crops through the finish (flowering) stage;
- Ability to present an oral presentation on the culture and production of two crops.

Part III. Course Outline and Schedule

The course schedule below describes the lecture outline (subject to change). The first column contains the lecture date; the second column lists the lecture topic or course activity; the third column provides information on student preparation for the class period (readings and podcasts) and assignments due on that date; and the fourth column lists the lecturer. ***Readings are from the required textbook, and podcasts are from e-gro.org, unless otherwise stated.***

Lecture date	Week	Lecture or lab activity	Reading from Ball Redbook (online)	Lecturer
Jan. 13 (T)	3	***Lecture 1: Syllabus overview & Easter lily production*** • ***Lab 1:*** Assign groups, select & measure lilies	*PDFs and links in D2L* *For lab: BRB Vol. 2, Ch. 5*	Lopez
Jan. 16 (F)	3	***Lecture 2: Easter lily production*** • ***Lab 2:*** WPS video, collect and go over data, place sticky cards, plant amaryllis		Lopez
Jan. 20 (T)	4	***Lecture 3: Plug production*** • ***Lab 3:*** Allocate new lilies, measure lilies & collect data	*Vol. 1 Ch. 7, Vol. 2, Ch. 13 PDFs*	Lopez
Jan. 23 (F)	4	***Lecture 4: Plug production*** • ***Lab 4:*** Go over data, Plant Dutch bulbs		Lopez
Jan. 27 (T)	5	***Lecture 5: Stock plants & liner production*** • ***Lab 5:*** Clean greenhouses, measure lilies & collect data ✓ ***D2L Quiz 1 DUE***	*The Floriculture Vegetative Cutting Industry PDF Vol. 2, Ch. 14*	Lopez
Jan. 30 (F)	5	***Lecture 6: Liner production*** • ***Lab 6:*** Go over data, plant Dutch bulbs ✓ ***Paper discussion 1 summary DUE***		Lopez
Feb. 3 (T)	6	***Lecture 7: Supply chain from breeder to consumer*** • ***Lab 7:*** Paper discussion 1, measure lilies & collect data, fill pots		**Jahnke**
Feb. 6 (F)	6	***Lecture 8: Liner production*** • **Lab 8:** Go over data, transplant cool-season crops (Raker, Mast, Pell, & DGI)		Lopez/ Smith
Feb. 10 (T)	7	***Lecture 9: Dutch bulb production*** ✓ ***D2L Quiz 2 DUE*** • ***Lab 9:*** Measure lilies & collect data, plant Dutch bulbs		**Miller**
Feb. 13 (F)	7	***NO CLASS – MSU CLOSED to Honor Victims***		
Feb. 17 (T)	8	***Lecture 10: Plant growth regulation*** • ***Lab 10:*** Stick cuttings (Dummen), measure lilies & collect data, fill pots for perennials ✓ ***Exam 1 DUE***		**Whipker**
Feb. 20 (F)	8	***Lecture 11: Biocontrol*** • ***Lab 11:*** Stick cuttings (Danzinger), transplant perennials		**Cervantes**
Feb. 24 (T)	9	***Field Trip to Detroit Area***		Lopez
Feb. 27 (F)	9	***Lecture 12: Annual Production*** • ***Lab 12:*** Measure lilies & collect data, transplant remaining perennials & Four Star ✓ ***D2L Quiz 3 DUE***		Lopez
Mar. 3 (T) Mar. 6 (F)	10	**Spring Break**		

Mar. 10 (T)	11	***Lecture 13: Perennial production*** • **Lab 13:** measure lilies & collect data, fill pots for annuals	https://www.canr.msu.edu/resources/firing_up_perennials_part_2	Lopez
Mar. 13 (F)	11	***Lecture 14: Container design and selecting plant for combinations*** • ***Lab 14:*** Mixed containers, hanging baskets, go over data ✓ ***Paper discussion 2 summary DUE***		**McGrath**
Mar. 17 (T)	12	***Lecture 15: Scheduling crops*** • **Lab 15:** Paper discussion 2, measure lilies & collect data		Lopez
Mar. 20 (F)	12	***Lecture 16: Pricing of floriculture crops*** • ***Lab 16:*** Review data, space and stake crops, pinch flowers, stake crops ✓ ***D2L Quiz 4 DUE***		**Knuth**
Mar. 24 (T)	13	***Lecture 17: Cultural management*** • **Lab 17:** Fill pots for tropicals		**Elbert**
Mar. 27 (F)	13	***Lecture 18: Environmental management*** ***Lab 18:*** Transplant tropicals ✓ ***Paper discussion 3 summary DUE***		**Smith**
Mar. 31 (T)	14	***Lecture 19: Greenhouse production software PICAS*** • **Lab 19:** Paper discussion 3, evaluate Easter lily crops	https://www.growpicas.com/	**Mitchell**
Apr. 3 (F)	14	***Lecture 20:* Identification of greenhouse insect and mite pests** ✓ ***Lab 20: Plant ID Quiz 1***		**Cloyd**
Apr. 7 (T)	15	**Lecture 21: *Diagnostics and pathogens*** • **Lab 21: TBD**		**Hausbeck and Byrne**
Apr. 10 (F)	15	***Extra Credit Kalamazoo Area Greenhouse Field Trip***		Lopez
Apr. 14 (T)	16	***Lecture 22: TBD*** • **Lab 22:** clean up crops ✓ ***Paper discussion 4 summary DUE*** ✓ ***D2L Quiz 5 DUE***		Lopez
Apr. 17 (F)	16	***Lecture 23: TBD*** • ***Lab 23: Plant ID quiz 2;*** Paper discussion 4 ✓ ***Fieldtrip DUE***		Lopez
Apr. 21 (T)	17	***Lecture 24:*** Five group presentations, evaluate other groups crops • **Lab 24:** TBD ✓ ***Paper discussion 5 summary DUE***		Lopez
Apr. 24 (F)	17	✓***Lab 25:*** Paper discussion 5, clean up crops & greenhouses ✓ **Culture sheets, Crop evaluations & Exam 2 DUE**		Lopez

***The above schedule is tentative and is subject to change

Part IV. Grading Policy
Assignments and Grading

Exams and Quizzes

Exams and quizzes will include different question formats (multiple-choice, fill-in-the-blank, and short- and long-answer essays).

Crop quality evaluations

At the end of the semester, we will spend time during one or two lab periods evaluating each other's crops. In addition to the crop being alive, your crops will be judged on uniformity and appearance, including flowering, height/compactness, etc. You will be provided with a sheet to evaluate peers' crops anonymously.

Table 2. Crop evaluation point breakdown.

Parameter	Points
Is the entire crop in flower and uniform?	3
Is the crop height appropriate?	3
Does the crop fill the container?	3
Is the crop free from insects, diseases, or blemishes?	3
Does the crop appear marketable?	3

Lecture and Lab session attendance and participation

The main goal of this course is to approach crop production systematically. During each week's lab session, you will be collecting information that will help you make the best decisions regarding crop production. There are 25 lab sessions throughout the semester, each worth 8 points. Simply attending labs will not guarantee full credit for each lab. Rather, you will need to be an active participant in the lab, clean up after yourselves, assist with data collection, and present weekly crop updates. We will discuss this in greater depth during the first lab period. ***Your group must check out before leaving the lab to ensure you receive your points.***

Grading

92-100% = 4.0
85-92% = 3.5
80-84% = 3.0
75-79% = 2.5
70-74% = 2.0
65-69% = 1.5
60-64% = 1.0
< 60% = 0

Table 4. Total point breakdown for the course

Item	Points
Exams	
Exams 1 and 2	150 each
Subtotal	**300**
Quizzes	
Quiz 1-5*	10 each
(*Lowest quiz score dropped) **Subtotal**	**40**
Plant ID quizzes	
Quiz 1-2	30 each
Subtotal	**60**
Paper discussions	
Paper discussion & summaries 1-5 (*Lowest quiz score dropped)	25 each
Subtotal	**100**
Students and professor crop evaluations	
20 crops	15 per crop
Subtotal	**300**
Field trips (1 required)	
Detroit Area (all day)	50
Kalamazoo Area (all day)	
Subtotal	**50**
Culture sheets	
Group culture sheets	5 crops × 15 points 3 crops for extra credit (45 points MAX)
Subtotal	**75**
Group presentation	
15 minute presentation on two crops	
Subtotal	**100**
Couse participation (see below)	
(2 missed classes/labs excused)*	
Subtotal	**310**
Grand total	**1,335 points**

	Meeting all expectations	Meeting most expectations	Needs improvement	Not meeting expectations	Points
Watering	5 – Plants are adequately watered	3 – Some plants are wilting or overwatered	1 – Most plants are wilting or overwatered	0 – Plants showing signs of stress (chlorosis/ necrosis from neglect	70 (5 pt. weekly/ 14 weeks)
Following directions	6 – all lab directions are followed	4 – Majority of lab directions have been followed	2 – Some of lab directions have been followed	0 – Lab directions have not been followed/ asks what are we doing today?	84 (6 pt. weekly/14 weeks)
Clean greenhouse/ headhouse	5 – GH/ HH floors & benches are clean, hoses neat and nozzle is not on the floor	3 – GH/ HH floors & benches are mostly clean, hoses neat and nozzle is not on the floor	1 – GH/ HH floors & benches are messy, hoses neat and nozzle is not on the floor	0 – GH/ HH floors & benches are dirty, hose is a tripping hazard & nozzle on the floor	70 (5 pt. weekly/14 weeks)
Attendance, participates in class & lab activities & discus.	5 – Attends class & lab for entire time, participates in activities/ discus., completes all lab assignments correctly	3 – Attends class & lab for majority of the time, participates in activities/ discus., completes most lab assignments correctly	1 – Misses 1 class & lab, does not participate in activities/ discus., completes some lab assignments correctly	0 – does not come to class or does not participate and group mates do all the work	70 (5 pt. weekly/14 weeks)
End of semester clean up	16 – Complete cleaning tasks			0 – Does not complete any cleaning tasks	16 points
					310 points

Late Work and Make-Up Policy

All assignments are due on the assigned due date. **No late assignments will be accepted**, unless the student contacts me ahead of time AND has extenuating circumstances. Assignments must be submitted on D2L. **No e-mailed assignments will be accepted.**

There will be no make-ups for missed quizzes or paper discussions for any reason. The lowest quiz score will be dropped. Make-ups for exams MUST be discussed with the professor BEFORE the exam to be considered for an alternative testing time. No exceptions (ie. unless you are hospitalized).

Viewing Grades

Grades will be posted on D2L for all assignments, quizzes, and tests. Please keep the assignments handed back to you and double-check your grades in D2L to avoid discrepancies.

Part V: Course and University Policies

Attendance

Students who fail to attend the first four class sessions or class by the fifth day of the semester, whichever occurs first, may be dropped from the course.

Participation

Students are expected to attend and participate in all classroom activities and labs. A participation grade will be assigned based on attendance and participation in both lecture and lab.

Lab and Greenhouse Attire and Rules

During the lab, we will work in the greenhouse. Please dress appropriately. Your clothing may get dirty, stained, bleached, wet, snagged, or otherwise damaged. Wear shoes that can become wet, and that will protect you from chemical residues and glass shards (which means "close-toed").

- Keep hose nozzles off the floor. This will prevent the spread of diseases.
- No nicotine use of any kind in the greenhouse or headhouse.
- Close all doors behind you. Keeping the doors closed will allow the heating/cooling to work at maximum capacity.
- Do not sit, stand, or put your foot on any of the greenhouse benches. This will prevent the spread of diseases and ensure your safety.
- Label all plant material following the directions given in class, and place the tags in the front of the pot and all facing the same direction
- Do not remove any plant material from greenhouses without approval.
- Dead/dying plant material must be removed promptly.
- No personal plants in the greenhouse to avoid the introduction of new pests and diseases.
- Sanitize all tools with isopropyl alcohol before using to prevent the spread of diseases.
- CLEAN UP AFTER YOURSELVES!

Understand When You May Drop This Course

The last day to add this course is the end of the first week of classes. The last day to drop this course with a 100 percent refund and no grade reported is 2/04/26. The last day to drop this course without a refund and without a grade reported is 3/09/26. You should immediately make a copy of your amended schedule to verify you have added or dropped this course.

Commercialized Lecture Notes

Commercialization of lecture notes and university-provided course materials is not permitted in this course.

Course Behavior

I expect a professional and congenial atmosphere where we all feel: 1) welcome; and 2) respected. We will be learning together and, to get the greatest benefit from the class, need to feel comfortable participating and engaging with one another.

Please *do*…
…ask questions.
…ask for clarification.
…stop by my office.
…be excited- this is going to be an enjoyable course!
Please *do not*…

…use poor language.
…wear sunglasses in the classroom.
…surf the internet or use a computer for non-class-related work.
…use your cell phone in any way unless there is an emergency.

AArticle 2.III.B.4 of the Student Rights and Responsibilities (SRR) for students at Michigan State University states: "The student's behavior in the classroom shall be conducive to the teaching and learning process for all concerned." Article 2.III.B.10 of the SRR states that "The student and the faculty share the responsibility for maintaining professional relationships based on mutual trust and civility." General Student Regulation 5.02 states: "No student shall . . . interfere with the functions and services of the University (for example, but not limited to, classes . . .) such that the function or service is obstructed or disrupted. Students whose conduct adversely affects the learning environment in this classroom may be subject to disciplinary action through the Student Judicial Affairs office.

Accommodations for Students with Disabilities

Accommodations for Students with Disabilities (from the Resource Center for Persons with Disabilities (RCPD): Michigan State University is committed to providing equal opportunity for participation in all programs, services, and activities. Requests for accommodations by persons with disabilities may be made by contacting the Resource Center for Persons with Disabilities at 517-884-7273, TTY: 517-355-1293, or on the web at https://www.rcpd.msu.edu/. Once your eligibility for an accommodation has been determined, you will be issued a Verified Individual Services Accommodation ("VISA") form. Please present this form to me at the start of the term and/or two weeks prior to the accommodation date (test, project, etc.). Requests received after this date may not be honored.

Academic Honesty

Article 2.III.B.2 of the Students Rights and Responsibilities SRR states: "The student shares with the faculty the responsibility for maintaining the integrity of scholarship, grades, and professional standards." In addition, HRT 221 adheres to the policies on academic honesty specified in General Student Regulation 1.0, Protection of Scholarship and Grades; the all-University Policy on Integrity of Scholarship and Grades; and Ordinance 17.00, Examinations. (See Spartan Life: Student Handbook and Resource Guide).

Therefore, unless authorized by your instructor, you are expected to complete all course assignments, including homework, quizzes, and exams, without assistance from any source. You are expected to develop original work for this course; therefore, you may not submit coursework you completed for another course to satisfy the requirements for this course. Also, you are not authorized to use the www.allmsu.com website to complete any coursework in this course. Students who violate MSU regulations on Protection of Scholarship and Grades will receive a failing grade in the

course or on the assignment. Faculty are required to report all instances in which a penalty grade is given for academic dishonesty. Students who are reported for academic dishonesty are required to complete an online course on the integrity of scholarship and grades. A hold will be placed on the student's account until the student completes the course. The Associate Provost for Undergraduate Education oversees this course.

Campus Emergencies

If an emergency arises in this classroom, building, or vicinity, your instructor will inform you of actions to follow to enhance your safety. As a student in this class, you are responsible for knowing the location of the nearest emergency evacuation route or shelter. These directions are posted on the maps displayed on the walls throughout this building. If police or university officials order us to evacuate the classroom or building, follow the posted emergency route in an orderly manner and assist those who might need help in reaching a barrier-free exit or shelter. To receive emergency messages, set your cellular phones to silent mode upon entering this classroom. If you observe or receive an emergency alert, immediately and calmly inform your instructor. (www.alert.msu.edu).