

## Plant Propagation

11:776:310 (3 credits)

Spring Semester (yearly)

Thursday (lecture) 10:55 – 12:15 Room 115 Floriculture Greenhouse

Friday (laboratory) 12:35 – 3:55 Room 115 Floriculture Greenhouse

Other laboratory locations: 104 Foran Hall; Rutgers Gardens

### CONTACT INFORMATION

Instructor: Dr. Thomas Molnar  
Office Location: 180 Foran Hall, 59 Dudley Rd., New Brunswick, NJ 08901  
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E-mail: molnar@aesop.rutgers.edu  
Office Hours: by e-mail appointment

### COURSE DESCRIPTION

In this lecture and laboratory course, emphasis is placed on not only learning the techniques involved with the many aspects of modern plant propagation, but also the science behind the methods. Students will acquire hands-on experience in the art and science of grafting, budding, rooting of cuttings, seedage, layering, tissue culture/micropropagation, propagation medias, greenhouse environmental control, and general plant care and greenhouse management. By learning the science behind the methods, students will develop a better understanding of why certain propagation methods were successful and why some were not. This experience and knowledge base will allow students to be better able to solve problems that arise during the propagation and growing of plants.

### COURSE WEBSITE, RESOURCES AND MATERIALS

- Course website: Sakai
- Recommended text: The following text is recommended but not required:
  - Hartman, Kester, Davies, and Geneve. 2009. Plant Propagation – Principles and Practices, 8<sup>th</sup>. Pearson
- Supplemental materials will be provided as needed or placed on reserve at Chang Library.

### PREREQUISITE

None

### COURSE LEARNING GOALS

(Link to Plant Biology Undergraduate Program Goals: <http://plantbiology.rutgers.edu/undergrad/plantbiology/>)

By the end of this course, the student will be able to:

1. Demonstrate proficiency in propagation of plants by seeds, rooting cuttings, grafting, budding, layering, and micropropagation (tissue culture) (addresses program goal 1)
2. Recognize how different stages of plant material, including growth and maturity level, as well as environmental conditions affect plant propagation success (addresses program goal 1)
3. Think critically about plant propagation to solve problems and communicate and explain the scientific basis for the different techniques and their individual use and application (addresses program goal 4)

## ASSIGNMENTS/RESPONSIBILITIES AND ASSESSMENT

### Grading\*

- Quizzes 25%
- Mid-term examination 25%
- Laboratory notebook and attendance 25%
- Final exam (comprehensive) 25%

Grades will be classified based on Rutgers approved system: A, B+, B, C+, C, D, and F.

\*Three to four quizzes will cover lecture and laboratory material. Make-up quizzes will not normally be permitted. Mid-term will cover all assigned readings, lecture, and laboratory material presented to date. The final exam is comprehensive (all assigned material throughout the semester). Laboratory notebooks (25% of grade) are due the last week of class.

**Learning goals assessment:** Specific questions on exams and the end of semester in-class presentation will be used to assess student knowledge of course learning goals, including demonstrated mastery of fundamental terms, propagation, and practices. In graded laboratory exercises, students will demonstrate proficiency in plant propagation and will communicate their understanding of the scientific basis for technique use and application (class learning goals 1 and 3). The percentage score on these assessments will determine the level of mastery: >90% outstanding; 80-89% good; 70-70% satisfactory; <69% unsatisfactory.

## PARTICIPATION GRADE AND ABSENCE POLICY

Class participation is required in this course. A student may miss up to a maximum of three classes without special permission or reason. Any subsequent absences without a reason attested by a recognized Rutgers authority will attract penalty (up to a maximum of 10% of the total score for the course).

Students who expect to miss more than three classes may use the University absence reporting website (<https://sims.rutgers.edu/ssra/>) to indicate the date and reason for the absence. An e-mail is automatically sent to the instructor.

## COURSE SCHEDULE

Session	Topic
1	Lecture: Introduction to plant propagation
2	Lecture: Review of plant biology basics; planting media
3	Lecture: Rooting of cuttings: principles and practices
4	Lab: Effects of media × hormone × environment on rooting
5	Lecture: Rooting of cuttings: principles and practices (continued)
	<b>Quiz 1</b>
6	Lab Group A: Effects of wounding × hormone concentration × hormone formulation on rooting Lab Group B: Plant tissue culture lab 1
7	Lecture: Seeds and seed propagation
8	Lab Group A: Plant tissue culture lab 1 Lab Group B: Effects of wounding × hormone concentration × hormone formulation on rooting
9	Lecture: Plant tissue culture, part 1 (Dr. C. Chin)
10	Lab Group A: Air layering, nut tree seeds Lab Group B: Plant tissue culture lab 2
	<b>Quiz 2</b>
11	Lecture: Plant tissue culture, part 2 (Dr. C. Chin)
12	Lab Group A: Plant tissue culture lab 2 Lab Group B: Air layering, nut tree seeds
13	Lecture: Grafting and budding principles
14	Lab: Hazelnut budding or tissue culture

Session	Topic
15	<b>Mid-term exam</b>
16	Lab: Hazelnut budding or tissue culture
	<b>Spring recess</b>
17	Lecture: Grafting and budding techniques
18	Lab: Apple grafting
19	Lecture: Grafting vegetables
20	Lab: Tomato grafting or field layering, depending on weather
21	Lecture: Layering principles and practices
	<b>Quiz 3</b>
22	Lab: Tomato grafting or field layering, depending on weather
23	Lecture: Substrates in plant propagation
24	Lab: graft aftercare (apples, hazelnuts, tomato)
25	Lecture: Bulbs, tubers, and roots and their propagation
26	Lab: Finalize rooting lab
27	Lecture: Plant propagation and production systems – hybrid willow vs. apple
28	Lab: Finalize air layering labs and other labs; pot up tissue culture plantlets, other greenhouse tasks
	Take your plants home – <b>lab notebook due the day of final exam</b>
	<b>Final exam (date to be determined)</b>

## FINAL EXAM/PAPER DATE AND TIME

The Online Final exam Schedule: <http://finalexams.rutgers.edu/>

## ACCOMODATIONS FOR STUDENTS WITH DISABILITIES

Please follow the procedures outlined at <https://ods.rutgers.edu/students/registration-form>. Full policies and procedures are at <https://ods.rutgers.edu/>

## ACADEMIC INTEGRITY

The university's policy on Academic Integrity is available at <http://academicintegrity.rutgers.edu/academic-integrity-policy/>

The principles of academic integrity require that a student:

- Properly acknowledge and cite all use of the ideas, results, or words of others.
- Properly acknowledge all contributors to a given piece of work.
- Make sure that all work submitted as his or her own in a course or other academic activity is produced without the aid of impermissible materials or impermissible collaboration.
- Obtain all data or results by ethical means and report them accurately without suppressing any results inconsistent with his or her interpretation or conclusions.
- Treat all other students in an ethical manner, respecting their integrity and right to pursue their educational goals without interference. This requires that a student neither facilitate academic dishonesty by others nor obstruct their academic progress.
- Uphold the canons of the ethical or professional code of the profession for which he or she is preparing.

Adherence to these principles is necessary in order to ensure that:

- Everyone is given proper credit for his or her ideas, words, results, and other scholarly accomplishments.
- All student work is fairly evaluated and no student has an inappropriate advantage over others.
- The academic and ethical development of all students is fostered.
- The reputation of the University for integrity in its teaching, research, and scholarship is maintained and enhanced.

Failure to uphold these principles of academic integrity threatens both the reputation of the University and the value of the degrees awarded to its students. Every member of the University community therefore bears a responsibility for ensuring that the highest standards of academic integrity are upheld.

## STUDENT WELLNESS SERVICES

**Just In Case Web App** <http://codu.co/cee05e>

Access helpful mental health information and resources for yourself or a friend in a mental health crisis on your smartphone or tablet and easily contact CAPS or RUPD.

**Counseling, ADAP & Psychiatric Services (CAPS)**

(848) 932-7884 / 17 Senior Street, New Brunswick, NJ 08901 / [www.rhscaps.rutgers.edu/](http://www.rhscaps.rutgers.edu/)

CAPS is a University mental health support service that includes counseling, alcohol and other drug assistance, and psychiatric services staffed by a team of professional within Rutgers Health services to support students' efforts to succeed at Rutgers University. CAPS offers a variety of services that include: individual therapy, group therapy and workshops, crisis intervention, referral to specialists in the community and consultation and collaboration with campus partners.

**Violence Prevention & Victim Assistance (VPVA)**

(848) 932-1181 / 3 Bartlett Street, New Brunswick, NJ 08901 / [www.vpva.rutgers.edu/](http://www.vpva.rutgers.edu/)

The Office for Violence Prevention and Victim Assistance provides confidential crisis intervention, counseling and advocacy for victims of sexual and relationship violence and stalking to students, staff and faculty. To reach staff during office hours when the university is open or to reach an advocate after hours, call 848-932-1181.

**Disability Services**

(848) 445-6800 / Lucy Stone Hall, Suite A145, Livingston Campus, 54 Joyce Kilmer Avenue, Piscataway, NJ 08854 / <https://ods.rutgers.edu/>

Rutgers University welcomes students with disabilities into all of the University's educational programs. In order to receive consideration for reasonable accommodations, a student with a disability must contact the appropriate disability services office at the campus where you are officially enrolled, participate in an intake interview, and provide documentation: <https://ods.rutgers.edu/students/documentation-guidelines>. If the documentation supports your request for reasonable accommodations, your campus's disability services office will provide you with a Letter of Accommodations. Please share this letter with your instructors and discuss the accommodations with them as early in your courses as possible. To begin this process, please complete the Registration form on the ODS web site at: <https://ods.rutgers.edu/students/registration-form>.

**Scarlet Listeners**

(732) 247-5555 / <http://www.scarletlisteners.com/>

Free and confidential peer counseling and referral hotline, providing a comforting and supportive safe space.