

# Hort 351: Plant Propagation Spring 2020

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**Lab Instructors:** Pullman: Carol Kawula; [carol.kawula@wsu.edu](mailto:carol.kawula@wsu.edu)  
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**Schedule:** Lectures 10:10 A M -11 AM MWF

Lab: Wed; 2.10 pm-5:00 pm

**Location:** Lecture: Johnson 204

Laboratory: Vogel Plant Biosciences 35; Green house

**Course Description:** Principles and methods of multiplying herbaceous and woody plants and their handling up to useable size. Field trip required.

**Prerequisites:** Biol 106, Biol 107, Hort 202


Student Learning Outcomes	Core assignments /activities for students to apply/demonstrate the SLOs
Use terminology and scientific concepts to describe plant propagation.	Recognize terms and concepts presented in lecture and textbook readings Discuss plant propagation concepts in the lab (1, 3, 5, 6*)
Conduct lab exercises to illustrate principles and techniques of plant propagation and present findings in tables/ graphs and charts	Conduct 'Hands on' laboratory exercise to illustrate principles and techniques of propagation. The students will write reports on the outcome of lab exercises and submit them for evaluation and feedback (1, 2, 3, 5, 6*)
Build critical thinking skills and practice working in groups	Students in group will design and carry out experiments to illustrate the principles of plant propagation. They will collect, analyze data, summarize findings in written reports for evaluation and feedback (1,2, 3, 5, 6*)

\*refers to program goals the course that specific learning objectives (SLO) contribute to

## *Required Text:*

Hartmann HT, Kester DE, Davies FE, Geneve R (2009) Plant Propagation: Principles and Practices (8<sup>th</sup> Edition). Supplemental information will be provided in the lectures.

The course will be taught in an open lecture format using powerpoints to enhance the visual learning process.

- Please avoid disturbing the class by coming late.
- Attendance will be recorded. Accounts for 5% of your final grade.
- While in class, engaging in activities other than intended for the class is discouraged.
- Use of cell phones during class and exams is not allowed. 
- Printed copies of the powerpoint slides are provided as handouts. YOU ARE REQUIRED TO MAKE ADDITIONAL NOTES DURING LECTURES AND/OR FROM THE TEXT. PLEASE NOTE THAT THE POWEPOINT OUTLINES ARE ONLY TO HELP NAVIGATION DURING LECTURES. THEY DO NOT SERVE AS NOTES IN PREPARING FOR THE EXAMS.

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- **Please note that the topics covered during the lectures will not follow the same order as presented in the textbook. The handouts will guide you to the topics covered and to be covered in the lectures. You are required find the corresponding topics in the text**
- DO NOT HESITATE TO LET THE INSTRUCTOR KNOW IF YOU HAVE ANY DIFFICULTUIES IN FOLLOWING THE LECTURES OR FINDING THE TOPICS IN THE TEXT.

### Examinations and Grading

- Three lecture examinations and one lab exam will be given during the semester. Each lecture exam will have approximately 80% emphasis on current information since the last test.
- Since this course has three lectures per week, there will be quite an amount of information covered and requires a significant amount of time in preparation to face the examination.
- There will be a review session before every examination. **YOU ARE REQUIRED TO COME PREPARED FOR THE REVIEW SESSION TO ASK QUESTIONS AND SEEK CLARIFICATION.**
- Questions will be drawn from lectures, reading, any assigned homework, or guest lectures.

Type of Questions	Testing attribute
<i>Fill in the blanks</i>	Answer recall
<i>Match the following</i>	Identify the correct response
<i>Multiple choice</i>	Identify the correct response
<i>True or False</i>	Distinguish between correct and incorrect responses
<i>Provide reasons</i>	Ascertain depth of understanding
<i>Short answers</i>	Use of proper language, spelling and grammar

- Discussion type questions will be used to assess comprehension and understanding. You are expected to organize ideas, thoughts and information in order to present logical, comprehensible answers to discussion-type questions.
- Proper use of grammar, syntax, and spelling will be beneficial in evaluating your answers and assign proper grade.
- The final exam will be comprehensive, and you are required to demonstrate your ability to synthesize knowledge gained throughout the semester into logical solutions for problems involved in plant propagation.
- Lab reports are due on the due date. Although the lab experiments are carried out in groups, you are required to write your own report.

**Test of Awareness:** This test will be administered during the course beginning. The performance in this test will NOT form a basis for your grade. The objectives of this test to are as follows:

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- To assess the background knowledge of students in the field of plant science as applicable to plant propagation
- To facilitate fine-tuning of lectures to suit the needs of students.
- To assess deficiencies, if any, in the background knowledge and alert students to pro-active measures that may facilitate succeeding in this course.

### Grading

Exam I (05 Feb 2020)	15%
Exam II (11 March 2020)	20%
Final Exam (Comprehensive) (May 07; 8-10 am)	25%
Class attendance	5%
Lab Reports	15%
Lab Quiz	5%
Field Trip attendance	5%
Laboratory Exam	10%
Total	
	100

Thurs., May 7						
Lecture Start time			Exam Time		Block Finals	
Days	Time range	3 credits	4 credits			
M,W,F	Daily	10:00 - 10:59 a.m.	8:00 - 10:00 a.m.	7:00 - 10:00 a.m.		
Tu,Th		5:31 p.m. and later	10:10 - 12:10 p.m.	10:10 - 1:00 p.m.		
			1:00 - 3:00 p.m.	1:00 - 4:00 p.m.	Econs 102	Fin 325
M,W,F	Daily	1:00 - 1:59 p.m.	3:10 - 5:10 p.m.	3:10 - 6:10 p.m.		
			7:00 - 9:00 p.m.	7:00 - 10:00 p.m.	Acctg 230	Fin 425    Math 103

Grading will be based upon a percentage basis:

Example:

A: 91-100%

B<sup>+</sup>: 88-90%

B: 85-87%

B<sup>-</sup>: 81-84%

### Field Trip

Field Trip is scheduled for Wed, March 25, 2020; 1.00-5.00 pm. We will be visiting **University of Idaho Pitkin Forest Nursery located at 1025 Plant Science Road, Moscow, Idaho 83843.** You are required to make plans in advance to make up work in other classes. Transportation is provided. No personal transport. You are required to pay for your meals.

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A letter to other instructors explaining the field trip and to excuse your absence from their class/es can be provided. You are responsible for making these arrangements.

## **Disability Statement:**

“Reasonable accommodations are available for students with a documented disability. If you have a disability and may need accommodations to fully participate in this class, please visit the Disability Resource Center (DRC). All accommodations MUST be approved through the DRC (Washington Building, Room 217). Please stop by or call 509-335-3417.” TriCities resource: West Bldg 269 372-7352

## **Syllabus**

### **Sexual Method of Propagation**

- Course introduction and introduction to plant propagation. Distinguishing features of sexual and asexual methods of plant multiplication.
- Sexual method of plant propagation. Structure and classification of seeds. Seed development: anatomical, morphological and hormonal considerations. Factors affecting germination. Seed dormancy and methods of alleviation of dormancy. Seed production, harvesting, seed treatment and storage.

### **Asexual Methods**

- Introduction to asexual methods of plant multiplication; advantages and disadvantages. Clones and cloning. Causes of variation within clones and origin of clonal cultivars. Development of chimeral segments and their impact on clonal propagation. Management of source plants.
- *Propagation of plants by cuttage*. Principles and techniques of plant regeneration from cuttings. Development of adventitious roots: anatomical, physiological, biochemical and molecular considerations. Plant and environmental factors affecting regeneration of roots. Propagation techniques facilitating root development from stem, leaf and root cuttings.
- *Propagation of plants by layering*: Distinguishing features of plant regeneration from cuttings and layering. Relative advantages over cuttings. Anatomical, physiological and hormonal aspects of root induction. Propagation techniques facilitating root development from layered plants.
- *Propagation of plants by grafting and budding*: The meaning of grafting and budding. Advantages of grafting and budding over other vegetative methods. The need for grafting. Limitations of grafting and budding. Anatomical and physiological basis of graft union formation. Graft incompatibility causes and methods of overcoming incompatibility. Rootstock and scion relationships. Techniques of grafting/budding
- *Micropropagation of plants*: Principles and methods of multiplying plants *in vitro*. Tissue culture and micropropagation. Constituents of different tissue culture media and their preparation. Selection and processing of explants. Adventitious and axillary shoot culture. Role of hormones in organogenesis. Strategies for acclimation of *in vitro* plants to *ex-vitro* conditions. Tissue culture

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environment. Principles and techniques of embryo, ovule, cell, protoplast, haploid, meristem and aseptic seed culture and micrografting techniques.

- *Propagation of plants by specialized structures:* Techniques of multiplying plants modified plant parts such as tubers, tuberous roots, bulbs, corms, offsets, runners stolons.
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