### http://kingsriverlife.com/wp-content/uploads/2014/10/reedleycollege.jpg

### *Spring 2022*

### EH 43

Plant Propagation/Production

### Syllabus

**Instructor:** Grace Mendes

**Department: Agriculture**

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**Phone:**

**Office Hours:** By Appointment Only

**Classroom: 504**

**Location: Selma High School**

**Term: Spring 2022**

**Section Number: 59115**

**Class Meeting: M-F 2:20pm – 3:10pm**

**3 Unit(s)**

**2 Lecture hour(s)/week**

**3 Laboratory hour(s)**

**18 Weeks**

**90 Total number of contact hour**

**Prerequisites: NONE**

**Advisory:** **Eligibility for English 125, 126, and Mathematics 201.**

**Course Description:** Plant propagation and production practices with emphasis on nursery operations including sexual and asexual reproduction, planting, transplanting, fertilizing, plant pest and disease control, structures and site layout. Preparation and use of propagating and planting mediums. Use and maintenance of common tools and equipment. Regulations pertaining to plant production.

**Course Goals:**

*Upon completion of this course, students will be able to:*

* Demonstrate the ability to grow plants from propagation to market size.
* Practice the procedures of plant propagation including seed, cuttings, budding, grafting, layering, and division.
* Determine the proper timing for the various propagation and production techniques appropriate to the plant species and propagation method.

**Objectives:**

*In the process of completing this course, students will:*

* Explain the effect of temperature, water, humidity, and fertility on plant growth
* Describe the principles of plant reproduction, sexual and asexual
* Exhibit the personal skills (attitude, work habits, etc.) For successful employment in the wholesale and retail nursery business
* Discuss control procedures for common garden, landscape, and greenhouse pests
* Demonstrate proper merchandising techniques
* Identify, use, and maintain common propagation, nursery and landscape tools and equipment
* Plan and design a nursery layout
* Construct nursery facilities
* Develop and present a propagation method demonstration
* Describe the various types of wholesale plant production industries
* Students identify, organize, plan and allocate resources
* Plan and design a wholesale nursery layout
* Interpersonal skills
* Develop a group presentation on a propagation method
* In the laboratory setting, students work cooperatively in meeting various objectives
* Acquires and uses information
* Identify common plants of landscape value in the area
* Discuss control procedures for common garden, landscape, and greenhouse pests
* Understands complex interrelationships
* Describe the principles of plant reproduction, sexual and asexual
* Describe and differentiate the processes of osmosis, transpiration, respiration, photosynthesis
* Explain the effect of temperature, water, humidity, and fertility on plant growth
* Works with a variety of technologies
* Practice the procedures of plant propagation including seed, cuttings, budding, layering, grafting, division
* Formulate planting and propagating media
* Measure and mix fertilizers and apply them

**Student Learning Outcomes:**

EH-43 SLO1: Demonstrate the ability to grow plants from propagation to market size.

EH-43 SLO2: Determine the proper timing for the various propagation and production techniques appropriate to the plant species and propagation method.

EH-43 SLO3: Practice the procedures of plant propagation including seed, cuttings, budding, grafting, layering, and division.

**Required or Recommended Textbooks and Materials:**

**Required Text:**

1. Textbooks:
   1. **Recommended:** Hartman, H.T., Kester, D.E., Davies, F.T. and Geneve, R.L. Hartmann and Kester’s Plant Propagation: Principles and Practices, ed. 8th Prentice-Hall, Saddle River, NJ, 2011,
   2. **Recommended:** Clarke and Toogood The Complete Book of Plant Propagation, Sterling Publications , -, 2001,

**Lecture Content:**

* Introduction to plant environmental requirements
* light
* Temperature
* Water
* Air
* Anchorage
* Minerals
* Photoperiodism and its effect on plant growth
* General aspects of plant propagation
* Objectives in the study of plant propagation
* Methods of propagating plants
* Basic types of reproduction
* Use and maintenance of common propagation and nursery tools and equipment
* Sexual propagation
* Principles of sexual propagation and hybridization
  + Production of flowers
  + Production of the embryo
  + Apomixes
  + Fruit and seed development
  + The mature seed
* The relationship of plant breeding to nursery practices
* Seed germination requirements and practice
* Seed collection and processing
* Discussion of various seed treatment processes
  + Scarification
  + Stratification
  + Heat treatment
* Transplanting of seedlings
* Plug production
* Asexual propagation
* Importance and reasons for using asexual propagation
* The clone
* The plant patent law
* Different types of asexual propagation
* Cuttings
* Requirements of cutting propagation
  + Moisture
  + Temperature
  + Media
  + Hormones
  + Disease prevention
  + Mother stock
* Types of cuttings
  + Hardwood, semi-hardwood, softwood, and herbaceous cuttings
  + Stem (tip, straight, heel, mallet, cane), leaf (segments, leaf bud, leaf vein, leaf petiole), root cuttings
* Hardening off of cuttings
* Potting and canning cuttings
* Seasonal timing and programming of cutting production
* Grafting and Budding
* Theoretical aspects
  + Reasons for Grafting and Budding
  + Formation of the graft union
  + Healing of the graft or bud
  + Polarity in grafting
  + Grafting incompatibility (rootstock selection, interstock)
  + Rootstock - scion relationships
* Techniques of Grafting
  + Methods
  + Tools and materials
  + Selection and storage of scion wood
  + Grafting classified according to placement
  + Aftercare of grafted trees
* Techniques of Budding
  + Methods
  + Seasonal timing
  + Wrapping buds
* Rootstock selection
  + Fruiting species
  + Ornamental species
* Other common propagation methods
* Layering
* Division
* Micropropagation/tissue culture
* Cultural considerations of nursery stock production
* Planting media formulation and usage
* Fertilizing and watering of plant stock
* Planting and transplanting nursery stock in a variety of containers
* Pruning, Pinching, Disbudding
* Chemical growth regulation
* Controlling insect and disease pests of nursery stock
* Preparation of nursery stock for sale
* Purchasing nursery stock for growing on or reselling
* Labeling/growing standards for retail sales and ads
* Propagation structures
* The greenhouse environment
* Cold frames and hot beds
* Shade structures and growing blocks

**Lab Content**

1. Setup / Safety / Rooting Media and Hormones  
   2.   Stem, Tip and Medial Cuttings  
   3.   Cane Cuttings, Single and Double Eye  
   4.   Heal, Leaf, Whole Leaf, Split Vein and Leaf Sections  
   5.   Layering, Tip Layering, Simple & Compound Layering, Air Layering  
   6.   Division, Stolons and Runners, Offsets  
   7.   Seperation, Bulbs, Corms, Crowns  
   8.   Whip and Side Grafting  
   9.   Approach, Four-Flap and Inlay Grafts  
   10.   Green Vegetable Grafting  
   11.   Topworking  
   12.   T and H budding  
   13.   Patch and Chip Budding

**Tentative Schedule: (pick one and modify as needed)**

**Example 1**

|  |  |  |  |
| --- | --- | --- | --- |
| **Week** | **Lecture** | **Lab** | **Lab Readings** |
| 1 | Biology of Plant Propagation Ch 2 | Lab Introduction; WPS Training; Facilities tour; Lab report writing; Graph and table preparation; How to search for peer‐reviewed articles |  |
| 2 | Biology of Plant Propagation  Ch 2 | Lab ‐ Abiotic factors affecting propagation success: **Lab report required (Scientific Journal Article Format)** | pp. 49‐54; 77‐82; 90‐98; 282; 293‐294; 354‐357;  383‐393 |
| 3 | **Quiz 1**; The Propagation Environment  **Ch 3** | Lab – Role of rooting hormone concentration: **Lab report required (Scientific Poster Presentation )**  **Rough draft of Scientific Article Materials and Methods due** | 293‐299; 373‐380 |
| 4 | The Propagation Environment  Ch 3 | Lab – Softwood and semi‐hardwood cuttings  **Rough draft of Scientific Article Introduction due** | pp. 344‐355; 363‐367; 373‐381; 396‐409 |
| 5 | The Propagation Environment  Ch 3 | **Field Trip** |  |
| 6 | **Exam 1 – Biology of Propagation, and Propagation Environment**  Theoretical Aspects of Vegetative Propagation  Ch 9 & 11 | Lab – Layering  **Field Trip Report Due**  **Abiotic lab last day to terminate experiment/collect final data** | Ch 14 |
| 7 | Theoretical Aspects of Vegetative Propagation  Ch 9 & 11 | Lab – Grafting and Budding  **Rough draft of Scientific Article Results due** | Ch 12, 13 |
| 8 | **Quiz 2;** Theoretical  Aspects of Vegetative Propagation  Ch 9 & 11 |  |  |
| 9 | Theoretical Aspects of Vegetative Propagation  Ch 9 & 11 | Lab – Specialized stems and other structures  **Completed Scientific Article lab report due** | pp. 357‐362; Ch 15 |
| 10 | **Exam 2 – Theoretical Aspects of Vegetative Propagation** | Lab – Breaking seed dormancy: **Lab report required (Scientific Paper Oral Presentation – group project)** | pp. 255‐262 |
| 11 | Theoretical Aspects of Seed Propagation  Ch 4, 6 & 7 |  |  |
| 12 | Theoretical Aspects of Seed Propagation  Ch 4, 6 & 7 |  |  |
| 13 | **Quiz 3;** Theoretical Aspects of Seed Propagation  Ch 4, 6 & 7 | **Scientific Poster Presentations (PSF 4)**  **Seed Dormancy Lab – last day to terminate experiment/collect final data** |  |
| 14 | Theoretical Aspects of Seed Propagation  Ch 4, 6 & 7 |  |  |
| 15 | **Quiz 4;** Theoretical Aspects of Seed Propagation  Ch 4, 6 & 7 | **Scientific Paper Oral Presentations (computer assisted presentation)**  **Clean up, take plants home or compost** |  |
| 16 | Theoretical Aspects of Seed Propagation  Ch 4, 6 & 7 |  |  |
| 17 |  |  |  |
| 18 | Final |  |  |

**Example 2**

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|  | **Lecture Topic/Unit** | **Lab** |
| * Week 1 | Course introduction | Course introduction: Greenhouse, facility |
| * Week 2 | Plant propagation-introduction | Propagation by Seed: stratification, scarification |
| * Week 3 | Biology of propagation | Tissue Culture Propagation: Media preparation, orchid seed germination |
| * Week 4 | Propagation facilities |  |
| * Week 5 | Development of seed | Tissue Culture Propagation: Sterilization, culture initiation |
| * Week 6 | Principles and practices of seed selection | Cutting Propagation: Deciduous woody plants |
| * Week 7 | Seed production and handling and Exam | Cutting Propagation: Evergreen Woody and Herbaceous plants |
| * Week 8 | Principles and Techniques of propagation by seed | Propagation by Grafting: Knife sharpening, bark and cleft grafts practice |
| * Week 9 | Principles of propagation by cuttings | Propagation by Grafting: Bark and cleft graft |
| * Week 10 | Techniques of propagation by cuttings | Propagation by Grafting: Whip and tongue graft |
| * Week 11 | Principles of grafting and budding, Exam | Propagation by Budding: T-budding, chip budding |
| * Week 12 | Techniques of grafting | Tissue Culture Propagation: Subcultures, soil establishment |
| * Week 13 | Techniques of budding |  |
| * Week 14 | Propagation by layering | Layering, Underground Storage Organs: Ficus, bulbs, corms, scales, tubers |
| * Week 15 | Propagation by specialized stems and roots | Propagation by Special Grafting Techniques: Cactus grafts, seedling grafts, micrografting |
| * Week 16 | Principles and practices of clonal propagation | Propagation by Division: Day lilies, orchids, ferns |
| * Week 17 | Principles to tissue culture and micropropagation, Techniques of micropropagation | Free Lab: Terminate experiments, turn in lab reports |
| * Week 18 | Final |  |

**Subject to Change:**

This syllabus and schedule are subject to change. If you are absent from class, it is your responsibility to check on any changes made while you were absent.

**Evaluation:**

Students will be evaluated on the basis of their performance on quizzes (announced and unannounced), written assignments, unit tests, lab projects and final examination according to the following scale. The instructor reserves the right to adjust scores as it may be required throughout the semester.

Unit Assignments 10%

Tests & Quizzes 20%

Projects 40%

Final Exam 20%

Your grade in this course will be based on the following scale:

A – 90 – 100%

B – 80 – 89%

C – 70 – 79%

D – 60 – 69%

F – 59% and below

**Attendance**

Lecture: Attendance is required and roll will be taken at each class meeting. There is no difference between an “excused” or “unexcused” absence. A “tardy” is considered an absence unless the student contacts the instructor at the end of class to change the status from absent to tardy. Two tardies will count as an absence. Any student who misses more than two weeks of class meetings within the first 9 weeks of class may be dropped from the class by the instructor (i.e., class meets two times per week, 4 absences; class meets 1 time per week, 2 absences).

Lab: Attendance in all labs is mandatory. Students must make prior arrangements with the instructor to be excused from lab. At that time, the instructor will determine, if any, make-up work will be appropriate.

Quizzes: There will be no make-ups for quizzes.

Tests: Make-up tests are limited to students who have made arrangements with the instructor prior to the required testing period or those students who have been excused by High School Attendance Office. Test material is constructed from class discussions, assigned readings, guest lectures, video presentations, and special assignments. Tests will consist of true/false and multiple choice questions. Unless the student receives prior approval from the instructor, no make-up tests will be allowed.

**Grading Policy/Scales/Evaluation Criteria**

For maximum point consideration, all written assignments and term reports should be typed and double-spaced. Lecture assignments (homework) will be accepted late up to the test for that unit of the course or 2 weeks past the deadline, whichever is sooner; however, late assignments will be penalized 1/5 of the possible points. Late laboratory assignments turned in within one week of the required due date will be accepted with a penalty equal to 1/5 of the maximum points. Any lab assignment turned in after that time up to the last regular class meeting will be accepted with a 50% penalty.

**College Policies:**

**Cheating & Plagiarism**

In keeping with the philosophy that students are entitled to the best education available, and in compliance with Board Policy 5410, each student is expected to exert an entirely honest effort toward attaining an education. Violations of this policy will result in disqualification for the course.

**Cheating is:**

1. Copying someone else’s class work or letting someone copy you, when your teacher tells you that the work is to be done on your own (includes asking/telling orally).
2. Copying answers on a test or letting someone copy from your test (includes asking/telling orally).
3. Using a cheat sheet or unauthorized notes.
4. Turning in someone else’s work as your own.
5. Text messaging and multi-media messaging.

**Consequences, Per School Year:**

***1st Offense -*** The teacher shall send a referral to office. Student shall receive an “F” or zero on the work or the test and a one (1) day suspension or Saturday School, parent contact required.

***2nd Offense -*** The teacher shall send a referral to the office. The student shall receive an “F” or zero on the work or the test and a one (1) day suspension with parent contact required. Student placed on honesty contract. A high school student shall be removed to a study hall/or alternative class with a “W/F” for the semester.

***3rd Offense -*** Recommendation for transfer.

Instances of cheating need not be confined to one (1) class. Each of the three (3) offenses could happen in a different class. Any student who is transferred to a study hall/or alternative class and then required disciplinary removal from the study hall/or alternative class shall be transferred to an alternative school site/program.

Each student is expected to assist in the overall environment of the classroom making it conducive to learning.

**Accommodations for Students with Disabilities**

If you have a verified need for an academic accommodation or materials in alternate media (i.e., Braille, large print, electronic text, etc.) per the Americans with Disabilities Act (ADA) or Section 504 of the Rehabilitation Act, please contact the instructor as soon as possible.

**Reedley College is committed to creating accessible learning environments consistent with federal and state law. To obtain academic adjustments or auxiliary aids, students must be registered with the DSP&S office on campus. DSP&S can be reached at (559) 638-3332.  If you are already registered with the DSP&S office, please provide your Notice of Accommodation form as soon as possible.**

**Work Ethic -** Most students are enrolled in college classes to obtain a quality job or to enhance their skills for advancement with their current employment situation. Employers look for a punctual, responsible individual who is prepared to go to work. Our goal is to replicate the workplace environment where a student can develop and demonstrate these desirable traits.

* Punctual: It is customary to arrive at least 5 minutes before work begins. Individuals will be terminated if they are not punctual.
* Responsible: It is expected than an employee works every scheduled work day. Individuals will be terminated if they are not responsible.
* Prepared: It is expected that an employee be prepared with he/she arrives for work. Students must have work shirts, safety glasses, and appropriate footwear to participate in the laboratory. If a student is not prepared, he/she cannot participate and will receive a zero (see “responsible”).

**Language -** English is expected to be spoken in class for the following reasons:

* All course content and materials are presented in English and class discussions all take place in English.
* All lab activities are conducted in groups and must have effective communication between all group members.
* Activities can be hazardous and it is vital that instructors receive feedback in English to ensure safe practices.
* This policy is designed so that instructors and all students may communicate in a common language.
* All individuals must have freedom of expression and are allowed and encouraged to communicate in the language of their choice outside of class times, including breaks.

**Behavioral Standards**

* Each student is responsible for his/her own work. Written assignments are not group assignments and no credit will be awarded for students who turn in the same work. Students suspected of cheating on tests and quizzes will receive no credit for that particular assignment and may be removed from the class.
* It is considered polite to turn off cell phones when in the classroom or shop. Please do so.
* There is no smoking, chewing tobacco, alcohol, or drugs allowed in classrooms, shops, or school vehicles.
* This class is set for the semester. All doctor’s appointments, interviews, meetings with counselor, and other types of appointments should be scheduled during your time outside of class.

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| Important Dates for Spring 2022 | | |
| **DATE** | **DAY** | **EVENT / DEADLINE** |
| 3-Jan | (M) | Campus re-opens after Winter Break |
| 7-Jan | (F) | Last day to add a full-term Spring 2022 class in person or online through WebAdvisor 5:00 p.m. |
| 10-Jan | (M) | Start of Spring 2022 semester |
| Jan 10 - Mar 11 | (M-F) | Short-term classes, first nine weeks |
| 17-Jan | (M) | Martin Luther King, Jr. Day observed (no classes held, campus closed) |
| 21-Jan | (F) | Last day to drop a Spring 2022 full-term class for full refund |
| 28-Jan | (F) | Last day to register for a Spring 2022 full-term class in person w/ authorization code |
| 28-Jan | (F) | Last day to drop a Spring 2022 full-term class to avoid a “W” in person |
| 30-Jan | (Su) | Last day to drop a Spring 2022 full-term class to avoid a “W” on WebAdvisor |
| 30-Jan | (Su) | Last day to add a Spring 2022 full-term class with an authorization code on WebAdvisor |
| 18-Feb | (F) | Lincoln Day observance (no classes held, campus closed) |
| 21-Feb | (M) | Washington Day observance (no classes held, campus closed) |
| 11-Feb | (F) | Last day to change a Spring 2022 class to/from Pass/No-Pass grading basis |
| 1-Mar | (T) | Deadline to apply for graduation for Spring 2022 completion |
| 11-Mar | (F) | Last Day to drop a full-term class (letter grades assigned after this date) |
| Mar 14 - May 20 | (M-F) | Short-term classes, second nine weeks |
| Apr 11 – April 15 | (M-Th) | Spring recess (no classes held, campus open) |
| 15-Apr | (F) | Good Friday observance (no classes held, campus closed) (classes reconvene April 18) |
| May 16-20 | (M-F) | Spring 2022 final exams week |
| 20-May | (F) | End of Spring 2022 semester/commencement |
| 30-May | (M) | Memorial Day holiday (campus closed) |

\*\* Withdrawal (W): A student will be assigned a grade of “W” for classes dropped on or after 20 percent of the duration of the class, up to and including 50 percent of the duration of the class. After the 50 percent point, the student must receive a letter grade other than a “W” (i.e., A, B, C, D, F, I, P, NP). Check with your instructor for the deadline applicable to your class.