

HOS 6932 Survey of Breeding Tools and Methods
 Graduate Level – 3 credit hours
 Spring 2022

Coordinator Instructors: Dr. Patricio R. Munoz Felipe Ferrao
 Fifield Hall Office 2211 Fifield Hall Office 1302
p.munoz@ufl.edu lferrao@ufl.edu

Module Instructors:

Dr. Patricio Munoz Dr. Felipe Ferrao Dr. Esteban Rios Dr. Carlos Messina

Dr. Kevin Wang Dr. Kevin Begcy Dr. Fred Gmitter Dr. Jude Grosser

Dr. Seonghee Lee

Teaching Assistant: TBD

Location and time: Tuesday period 5 (11:45 AM – 12:35 PM), Fifield 2318
 Thursday periods 5-6 (11:45 AM – 1:40 PM), Fifield 2318
 Zoom would be provided for REC students

Prerequisite Basic knowledge of physiology, genetics, plant breeding and plant biology reproduction is required for all modules. Basic statistics and experimental design will be required for some modules.

Course Description

This course provides a short review of some important methods and techniques used in plant breeding. The intent of the course is to help students understand the breadth of disciplines in plant breeding. These will be taught by experts using these techniques and methods in their breeding programs. Frequent evaluations will occur during the semester by topic.

Intended Audience

The course is designed for graduate students working in plant breeding (e.g. agronomy, horticulture, environmental horticulture, and forestry), or any student in biological science who wants to deepen his/her knowledge about the methods and techniques and their applications in plant breeding.

Course Objectives

The course goal is to familiarize students with the application of diverse techniques used in plant breeding for cultivar development. By the end of the semester students should be able to acknowledge the existence and describe the methods cover in class. Students should be able to describe the advantages and disadvantages of the different methods covered in the course. Students should also be able to identify what method and what strategy should be applied depending on the crop species, the breeding goals, the population and the timeframe.

Evaluation

Points	Type	Topic
9	Quiz	Plant Breeding
13	Quizzes	Genomic Selection
13	Quizzes	Marker Assisted Selection
13	Quizzes	Phenomics
13	Quizzes	GS and Crop Modeling
13	Quizzes	Chromosome Manipulations
13	Quizzes	Gene Editing
13	Quizzes	Embryo Rescue, Protoplast Fusion
100	TOTAL	

Letter Grade

A >90 B+ 85 to 89 B 80 to 84 C+ 75 to 79 C 70 to 74 D+ 65 to 69 D 60 to 64 E < 60

UF grading policies: <https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

Evaluation Description

Each section will be evaluated by quizzes of material cover in class. These quizzes will last 5-10 min and will be posted online as assignments outside the class period but during the week the class is covering the subject of the quizzes.

Software

For some of the modules you will need to bring your own laptop. The main software used will be the statistical software R which can be downloaded from www.r-project.org, and R-studio <http://www.rstudio.com/>. It is your responsibility to make sure that your computer has the latest version of R. Prior to the first day of class, please make sure you have removed all old versions of R, and have the most recent version installed.

There are numerous online resources available for R; however, if you would like a traditional textbook, The R Book, is widely available and comprehensive.

Crawley, M. J. (2012). The R book. John Wiley & Sons.

Required and Recommended Literature

This course does not have required nor recommended textbook.

Course Schedule and Topics (Tentative).

Week of semester Month/day	Module #: General Topic Description – Instructor in charge
Wk 1 01/06	M0: Introduction, Plant Breeding – Dr. Patricio Munoz
Wk 2 01/11; 01/13	M1: Quantitative genetics and genomic selection – Dr. Felipe Ferrao
Wk 3 01/18; 01/21	M1: Quantitative genetics and genomic selection – Dr. Felipe Ferrao
Wk 4 01/25; 01/27	M2: Marker Assisted Selection – Dr. Seonghee Lee
Wk 5 02/01; 02/03	M2: Marker Assisted Selection – Dr. Seonghee Lee
Wk 6 02/08; 02/10	M3: Phenomics – Dr. Kevin Wang
Wk 7 02/15; 02/17	M3: Phenomics – Dr. Kevin Wang
Wk 8 02/22; 02/24	M4: Integration of GS and Crop Modeling – Dr. Carlos Messina
Wk 9 03/01; 03/03	M4: Integration of GS and Crop Modeling – Dr. Carlos Messina
Wk 10 03/15; 03/17	M5: Chromosome manipulation and Mutagenesis – Dr. Esteban Rios
Wk 11 03/22; 03/24	M5: Chromosome manipulation and Mutagenesis – Dr. Esteban Rios
Wk 12 03/29; 03/31	M6: Gene Editing – Dr. Kevin Begcy
Wk 13 04/05; 04/07	M6: Gene Editing – Dr. Kevin Begcy
Wk 14 04/12; 04/14	M7: Embryo Rescue, Protoplast Transfusion – Dr. Fred Gmitter and Dr. Jude Grosser
Wk 15 04/19	M7: Embryo Rescue, Protoplast Transfusion – Dr. Fred Gmitter and Dr. Jude Grosser

Attendance and Make-Up Work

“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:

<https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>”

Online Course Evaluation Process

“Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at <https://evaluations.ufl.edu>. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/results/>”

Academic Honesty

“UF students are bound by The Honor Pledge which states, “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students 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.” The Honor Code (<http://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.”

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 as appropriate.

Services for Students with Disabilities

“Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, www.dso.ufl.edu/drc/) 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.”

Campus Helping Resources

Health and Wellness:

U Matter, We Care: If you or a friend is in distress, please contact umatter@ufl.edu or 352 392- 1575 so that a team member can reach out to the student.

Counseling and Wellness Center: <http://www.counseling.ufl.edu/cwc/Default.aspx>, 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

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