

**AGR 6322 Advanced Plant Breeding**  
Graduate Level – 3 credit hours  
Fall 2014

**Instructor:** Dr. Patricio R. Munoz  
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Office Hours TBA

Dr. Matias Kirst (Population Genetics module)  
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Office hours TBA

**Teaching Assistant:** Esteban Rios (M.Sc.)  
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Tuesdays 10:45 – 12 pm, McCarty Hall B Room 2108

**Location and time:** Tuesday 2 and 3<sup>rd</sup> periods (8:30-10:25), RKN 0106  
Thursday 2<sup>nd</sup> period (8:30-9:20), RKN 0106

**Prerequisite**

AGR5321 – Genetic Improvement of Plants or equivalent plant breeding course plus STA6167 or equivalent.

**Course Description**

We will explore the topics of population genetics, pedigree breeding, mating designs and genomic breeding. The quantitative genetics associated with the mating design as well as how to select the appropriate design depending on the species, mode of reproduction and breeding strategy will be discussed. Finally, we will discuss strategies to incorporate genomic information in different breeding programs.

**Intended Audience**

The course is designed for graduate students who have plant breeding as a major or minor.

**Course Objectives**

To familiarize students with advanced breeding strategies, methods, and techniques in plant breeding. At the end of the course, students should be able to describe and discuss population genetic parameters needed in breeding, mating designs, differentiate between mating designs for additive and dominance variation and genomic selection.

**Evaluation**      10 points - Quizzes, one or two per calendar month  
20 points - Paper Discussions  
20 points – Individual Project  
25 points - Partial Take-home Exam Oct 28<sup>th</sup>  
25 points - Partial Take-home Exam Nov 20<sup>th</sup>

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

### Quizzes

Quizzes will be in the first 5 minutes of the class. There will be no notice of when quizzes are happening and there is no make up of quizzes.

### Paper Discussion

Scientific papers readings will be assigned one week in advance. Students will be randomly chosen to lead the discussion and evaluated based on discussion participation. Each student will receive a grade after each discussion which will be averaged at the end of semester. No discussion grades make-up.

### Individual Project

The project will be evaluated in two instances; September 30 and November 25. Each student will select a species/crop (preferably a crop with an existing breeding program at UF) and describe all information needed for breeding: biology of the species, traits of importance, genetic parameters, breeding strategy as well as market information, etc.

Each student will present the project on September 30 where questions and improvement to his work will be recorded and expected to be included in the second presentation on November 25. In this second instance each student should also include a small interview of a breeder or industry representative as a complement to the previous work and to understand the differences between breeding programs for the same crop/species in different institutions. Each student will be evaluated twice and the average will be recorded as the project score. If you are unable to attend the presentation day the instructor must be notified prior to that date by phone or email if you wish to make up the presentation. Without notification a zero will be recorded.

### Exams

Exams will be take-home and due in 24 hours after handing out. If you are unable to take an exam the instructor must be notified prior to the exam by phone or email if you wish to make up the exam. Without notification a zero will be recorded.

### Recommended Literature

D.L. Hartle & A.G. Clark – *Principles of Population Genetics*, Fourth Edition. 2006.

D.S. Falconer – *Introduction to Quantitative Genetics*, 2<sup>nd</sup> edition. 1981.

M.L. Lynch & B. Walsh – *Genetics and Analysis of Quantitative Traits*. 1998

### Course Schedule and Topics (Tentative)

Topic	Description
1	Population Genetics I (Dr. Kirst)
2	Population Genetics II (Dr. Kirst)
3	Basic Concepts in Plant Breeding – Review
4	Pedigree Breeding I
5	Pedigree Breeding II
6	Project Presentation I
7	Mating Designs I
8	Mating Designs II
9	Inbreds and Hybrids
10	Molecular tools in Plant Breeding
11	Marker Assisted Selection
12	Genomic Breeding I
13	Genomic Breeding II
14	Project Presentation II
15	Cultivar Release and Marketing

**No class on Tuesday Nov 11, Thursday Nov 27 2014 due to UF holidays.**

### **Attendance and Make-Up Work**

Requirements for class attendance and make-up exams, assignments and other work are consistent with university policies that can be found at: <https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>.

### **Online Course Evaluation Process**

Student assessment of instruction is an important part of efforts to improve teaching and learning. At the end of the semester, students are expected to provide feedback on the quality of instruction in this course using a standard set of university and college criteria. These evaluations are conducted online at <https://evaluations.ufl.edu>. Evaluations are typically open for students to complete during the last two or three weeks of the semester; students will be notified of the specific times when they are open. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/results>.

### **Academic Honesty**

As a student at the University of Florida, you have committed yourself to uphold the Honor Code, which includes the following pledge: *"We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity."* You are expected to exhibit behavior consistent with this commitment to the UF academic community, and on all work submitted for credit 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."*

It is assumed that you will complete all work independently in each course unless the instructor provides explicit permission for you to collaborate on course tasks (e.g. assignments, papers, quizzes, exams). Furthermore, as part of your obligation to uphold the Honor Code, you should report any condition that facilitates academic misconduct to appropriate personnel. It is your individual responsibility to know and comply with all university policies and procedures regarding academic integrity and the Student Honor Code. Violations of the Honor Code at the University of Florida will not be tolerated. Violations will be reported to the Dean of Students Office for consideration of disciplinary action. For more information regarding the Student Honor Code, please see: <http://www.dso.ufl.edu/sccr/process/student-conduct-honor-code>.

### **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**

The Disability Resource Center coordinates the needed accommodations of students with disabilities. This includes registering disabilities, recommending academic accommodations within the classroom, accessing special adaptive computer equipment, providing interpretation services and mediating faculty-student disability related issues. Students requesting classroom accommodation must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student who must then provide this documentation to the Instructor when requesting accommodation

0001 Reid Hall, 352-392-8565, [www.dso.ufl.edu/drc/](http://www.dso.ufl.edu/drc/)

### **Campus Helping Resources**

Students experiencing crises or personal problems that interfere with their general well-being are encouraged to utilize the university's counseling resources. The Counseling & Wellness Center provides confidential counseling services at no cost for currently enrolled students. Resources are available on campus for students having personal problems or lacking clear career or academic goals, which interfere with their academic performance.

*University Counseling & Wellness Center, 3190 Radio Road, 352-392-1575, [www.counseling.ufl.edu/cwc/](http://www.counseling.ufl.edu/cwc/)*

Counseling Services  
Groups and Workshops  
Outreach and Consultation  
Self-Help Library  
Wellness Coaching

*Career Resource Center, First Floor JWRU, 392-1601, [www.crc.ufl.edu/](http://www.crc.ufl.edu/)*