

## Plant Sciences 653 Advanced Plant Breeding

### Course Description

Principles and methodologies targeting genetic gain for crop improvement will be examined. Concepts of qualitative and quantitative trait improvement such as availability and selection of parental germplasm, hybridization, population formation, inbreeding, genetic variance, heritability, selection methods, molecular genetic markers, and genomic selection will be explored. Co-req: ANSC/PLSC 571 Design and Analysis of Biological Research and general genetics, or equivalent, or consent of instructor. Spring, alternate odd years, 3-credits.

### Meeting Times for Spring 2021

Tuesdays and Thursdays 9:50-11:05 Brehm Animal Sciences Rm 135

### Office Hours

by appointment, PBB Rm 254

### Learning Objective

To familiarize the student with principles and methodologies targeting genetic gain for plant improvement.

### Textbooks

Although no textbooks are required, students are encouraged to purchase and review on their own a *planting breeding* textbook and a *quantitative genetics* textbook to supplement course notes and expand concepts, principles, and knowledge.

Either the book by Fehr together with the book by Falconer and Mackay, or the two books by Bernardo are recommended (see below)

Several good textbooks exist. A few selected examples are listed below:

Acquaah, G. 2012. Principles of Plant Genetics and Breeding, Second Edition, John Wiley & Sons, Ltd, Chichester, UK. doi: 10.1002/9781118313718. Free access to download full book is at <http://onlinelibrary.wiley.com/book/10.1002/9781118313718>

Sleper, D. 2006. Breeding Field Crops, 5<sup>th</sup> edition. Blackwell Publishing. ISBN: 9780813824284. <https://www.wiley.com/en-us>

Bernardo, R. 2014. Essentials of Plant Breeding. ISBN 978-0-9720724-2-7. Stemma Press. Woodbury, MN. <http://stemmapress.com>

Bernardo, R. 2010. Breeding for Quantitative Traits in Plants. ISBN 978-0-9720724-1-0. Stemma Press. Woodbury, MN. <http://stemmapress.com>

Falconer, D.S. and Trudy F. C. MacKay. 1996. Introduction to Quantitative Genetics. Addison-Wesley Pub Co.; 4th edition. ISBN: 0582243025

Fehr, W.R. Principles of Cultivar Development, Volume 1: Theory and Technique. Iowa State University Press. University Bookstore, Memorial Union, Iowa State Univ. *Phone*: 515-294-5684 or download full text

[https://lib.dr.iastate.edu/cgi/viewcontent.cgi?article=1000&context=agron\\_books](https://lib.dr.iastate.edu/cgi/viewcontent.cgi?article=1000&context=agron_books)

Lynch, Michael and Bruce Walsh. 1998. Genetics and Analysis of Quantitative Traits. Sinauer Associates, Inc. ISBN: 0-87893-481-2

## Grades

<u>Assignment</u>	<u>Percentage</u>
Homework	45
Exam	25
Executive Summary & Budget for Research Grant Proposal	15
Research Grant Oral Presentation	<u>15</u>
Total	100

## Grading Scale (total course performance percentage)

A	93-100
A-	90-92
B+	85-89
B	83-84
B-	80-82
C+	75-79
C	70-74
D	60-69
F	<60

Students earning the percentages outlined above will be assured of earning at least the letter grade indicated, based on assessment of individual and class performance during this semester.

## COVID-19

Students who are out due to COVID-19, other illness or approved absence may request that a voice recording of the lecture be made. Voice recordings will only be made upon request for an approved absence.

Several COVID-19 resources may be found at: <https://hr.utk.edu/important-resources/>

If the instructor is out with COVID, lessons will continue via voice recording of the Powerpoint lecture. These will be available on Canvas. If instructor is unable to record lessons then Dr. Mia Cunicelli or other individual will make the recordings.