

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 genetically engineered crops 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 2017

Tuesdays and Thursdays 11:10-12:25, Ellington Plant Science Building Rm 123

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.

The recent works of Dr. Rex 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.

<http://onlinelibrary.wiley.com/book/10.1002/9781118313718>

Acquaah, G. 2006. Principles of Plant Genetics and Breeding. Blackwell Publishing.

ISBN: 9781405136464. <http://www.blackwellpublishing.com>

Sleper, D. 2006. Breeding Field Crops, 5th edition. Blackwell Publishing.

ISBN: 9780813824284. <http://www.blackwellpublishing.com>

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.
<http://www.isubookstore.com/MerchDetail.aspx?MerchID=823471>
or Phone: 515-294-5684

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	35
Class Participation/Discussion	20
Exam	20
Executive Summary & Budget for Research Grant Proposal	10
Research Grant Oral Presentation	<u>15</u>
Total	100

Grading Scale (total course performance percentage)

A	90-100
B+	85-89
B	80-84
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.