Plant Breeding and Biotechnology – Agronomy/Horticulture 338
Spring 2017

General Information:
3 Credits - University of Wisconsin – Madison. Undergraduate level (open for graduates).
Class schedule: Monday, Wednesday and Friday 8:50 - 9:40 am.
Classroom: Moore 351

Instructors:

Lucia Gutierrez
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Teaching Assistant:
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Course catalog summary: 3 cr. Principles of transferring plant genes by sexual, somatic, and molecular methods and the application of gene transfer in plant breeding and genetic engineering to improve crop plants. Prereq> Botany 130 or Genetics 160 or Biocore 301 or cons inst.

Learning goals: To provide a solid foundation in genetics, taught in the context of plant breeding, plant biotechnology, and world food, feed, and raw material needs.

Textbooks:
Principles of Genetics, 6th edition (a.k.a. S&S). D.P. Snustad and M.J. Simmons. Wiley and Sons, Inc. 2012 ISBN: 9780470903599
Principles of Plant Genetics and Breeding 2nd edition, Acquaah (a.k.a Acq), Wiley-Blackwell. 2012. ISBN: 9780470664766

Assessment: Different assessment activities will be provided. The goal of the assessment activities are to: 1) encourage you to prioritize your time for this course; 2) give you various opportunities to learn during the course; and 3) help you assign your grade for the course. Grading will be based on the following activities:

Exam I: 27%
Exam II: 27%
Exam III: 27%
Assignments: 19%

Grades: A: 92 to 100; AB: 90 to 91; B: 82 to 89; BC: 80 to 81; C: 70 to 79; D: 60 to 69.
Assignments are expected on the due date; if late, you will be penalized with a 20% deduction.

You may earn up to 12 extra credit points if you turn in a book report:

[4 points] Starved for Science: How biotechnology is being kept out of Africa. Robert Paarlberg, Harvard Press.
[4 points] The End of Food. Paul Roberts. Houghton Mifflin Harcourt.
[4 points] The Botany of Desire: A plants-eye view of the world. Michael Pollan. Random House.
[4 points] Food Politics: What everyone needs to know. Robert Paarlberg, Oxford University Press.
[4 points] Mendel in the Kitchen. A scientist's view of genetically modified food. Nina Federoff and Nancy Marie Brown. Joseph Henry Press, Washington, D.C.
[4 points] Betting on Famine: Why the world still goes hungry. Jean Ziegler. The New Press, NY.
[Negotiable] Book of your choice. Confirm with me before proceeding.

All book reports are due April 21st no later than 5:00 p.m. via Canvas– No extra credit work will be accepted after this date!

Academic dishonesty (cheating)
I expect that you work on individual homework and exams on your own. I expect you work on your team projects as a team. Cheating and/or plagiarism will not be tolerated, and will be treated according to UW Academic Misconduct Guidelines in dealing with the offense. This may range from failure on an assignment or exam, failure in the course, or expulsion from UW-Madison – foregoing your opportunity to receive a degree from here – EVER – in the future. Plagiarism is a serious offense. All sources and assistance used in preparing your papers must be precisely and explicitly acknowledged. For more information on plagiarism, please read the following information http://www.wisc.edu/students/saja/misconduct/UWS14.html#points. Ignorance of what constitutes plagiarism is not a defense. It is your responsibility to be sure. The web creates special risks. Cutting and pasting even a few words from a web page or paraphrasing material without a reference constitutes plagiarism. If you are not sure how to refer to something you find on the internet, you can always give the URL. For more information on writing and source citation, the following may be helpful: www.wisc.edu/writing/Handbook/Acknowledging_Sources.pdf.

Detailed Schedule:

Date	Topic	Teacher	Reading	Due date of Assignments
Wed Jan 18	Introduction (RS project)	Lucia	Chapter 1 S&S; Chapter 1,2 Acq	
Fri Jan 20	Mitosis / Meiosis; Life Cycle of Plants	Brett/ Mona	Chapter 2 S&S; Chapter 4 Acq	
Mon Jan 23	Mitosis / Meiosis; Life Cycle of Plants	Shawn	Chapter 2 S&S; Chapter 5 pp 97-102 Acquaah	

Wed Jan 25	Basic Principles of Inheritance	Shawn	Chapter 3 S&S; Chapter 5 (109-114) Acq	1: Introduction Paper
Fri Jan 27	In-class single gene inheritance/chi-square	T.A.		
Mon Jan 30	Extensions of Mendelism	Shawn	Chapter 4 S&S; Chapter 5 (109-114) Acq	
Wed Feb 1	Linkage, crossing-over, and genetic mapping	Shawn	Chapter 7 S&S	2: Basic Princip. of Inheritance
Fri Feb 3	In-class linkage, crossing-over, and genetic map	T.A.	Chapter 7 S&S	
Mon Feb 6	Variation in Chromosome Number and Structure	Shawn	Chapter 6 S&S; Chapter 5 (115-119) Acq	3: Adv. Princip. of Inheritance
Wed Feb 8	Finish variation in ch. number and Exam 1 Rev.	Shawn		
Fri Feb 10	Exam I			
Wed Feb 15	In-class exercise: flower structures; Incompatibility mechanisms.	T.A.	*Chapter 5,7 – Acquaah; videos on Learn@UW*	
Mon Feb 13	Plant reproduction, flower structures, and pollination methods.	Lucia Kamron	*Chapter 5,7 – Acquaah; videos on Learn@UW*	
Fri Feb 17	Inheritance of Complex Traits: Population Genetics	Lucia	Chapter 22 and 23 S&S; Chapter 3 and 4 Acq	
Mon Feb 20	In-class quantitative variation exercise (mean, variance, and heritability)	T.A.	Chapter 22 and 23 S&S; Chapter 3-4 Acq	
Wed Feb 22	Inheritance of Complex traits: Quantitative Traits	Lucia	Chapter 22 and 23 S&S; Chapter 3-4 Acq	
Fri Feb 24	Review of Quantitative Genetics Exercises	Lucia		
Mon Feb 27	Inheritance of Complex traits: Genotype by environment interaction	T.A.		
Wed Mar 1	Origins of Agriculture, Crop Domestication and Germplasm	Lucia	Chapter 9 to 11 – Acquaah	4 Pop. and Quantitative Genetics
Fri Mar 3	General Principles of Breeding	Lucia		
Mon Mar 6	Hot potatos/breeding methods	T.A.		
Wed Mar 8	Recurrent Selection; Recurrent Mass selection in Fast Plants Exercise	Lucia T.A.	Chapter 17 Acquaah	
Fri Mar 10	Inbreeding depression/Heterosis	Lucia		
Mon Mar 13	Breeding Self-pollinated Crops	Lucia	Ch. 16 & 31 Acquaah	
Wed Mar 15	Breeding Cross-pollinated Crops	Lucia	Ch. 18 and 32,33 Acquaah	

Fri Mar 17	No-class			5: Book report
Mar 18 - 26	SPRING BREAK			
Mon Mar 27	Breeding cross-pollinated crops: intra- e inter-population improvement	Lucia		
Wed Mar 29	Breeding asexually propagated crops	Lucia	Chapter 19 and 37,41 Acq	
Fri Mar 31	Exam review	Lucia		
Mon Apr 3	Exam II			
Wed Apr 5	Transcription and Translation	Lucia	Chapter 10 & 11 S&S	
Fri Apr 7	Methods in Molecular Biology: molecular markers	Lucia	Chapter 20 to 22 Acq	
Mon Apr 10	Methods in Molecular Biology: sequence and genomes	Lucia	Chapter 15 S&S; Chapter 20,25 Acq	
Wed Apr 12	Methods in molecular Biology: omics	Lucia	Chapter 15 S&S; Chapter 20,25 Acq	
Fri Apr 14	Methods in Molecular Biology: Marker Assisted Selection	Lucia	Chapter 14; 20 to 22 Acq	
Mon Apr 17	Methods in Molecular Biology: Marker Assisted Selection	Lucia	Chapter 20 to 22 Acq	
Wed Apr 19	Epigenetics	Lucia		
Fri Apr 21	Tissue Culture Methods	Heidi	S.S.&F., Tissue Culture Chapter. On Learn@UW	Extra Credit Reports due!
Mon Apr 24	*Methods of plant transformation*	Heidi	FAO Module A, Chapters 3 & 4, on Learn@UW	
Wed Apr 26	*Methods of plant transformation*	Heidi	FAO Module A, Chapters 3 & 4, on Learn@UW	6 – Transgenic Plant
Fri Apr28	Transgenic Cultivars and Release – Regulatory processes for transgenes	Heidi	Chapter 25: pp478-480 Acquaah	
Mon May 1	Exam II			
Wed May 3	Final Class Summary - Class Evaluation	Lucia		

Scheduled Final Exam Time: May 5th 10:05 – 12:05 NO EXAM WILL BE HELD ON THIS DATE AND THE LAST EXAM IS NOT COMPREHENSIVE