AGRN 472

- Principles of Plant Breeding –

INSTRUCTOR: Dr. Win Phippen
310 KH or KH 208 LAB
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CLASS: Monday and Wednesday, 200-2:50pm KH 226

LABORATORY: Thursday, 1:00-2:50pm KH 207, Greenhouse

CREDITS: 3 hours

OFFICE HOURS: Mon. and Wed. 11-12:00pm, Thurs. 10-12:00pm or by appointment

REQUIRED TEXT:
Breeding Field Crops, 5th Edition. 2006. By David A. Sleper and John M. Poehlman,
ISBN: 0813824281

SUGGESTED TEXT:
Plants, Genes, and Agriculture: Sustainability through Biotechnology. 2018. By Maarten J. Chrispeels and Paul Gepts. ISBN: 9781605356846

COURSE DESCRIPTION: This is as an upper level course for students with an interest in learning how crop plants can be improved by altering their genetic make-up through traditional approaches. The course covers methodology, theory, and applications with particular emphasis on integrating the various approaches to achieve overall crop improvement goals. The course will cover the methods of gene transfer by sexual hybridization including the founding principles and methods of conventional plant breeding. Asexual methods of gene transfer will also be discussed. The course will also explore the use of cell and tissue culture methods such as sterile propagation, embryo rescue, and protoplast fusion techniques. Finally, we will cover government regulations, public concerns, and legal protection of improved crops.

GRADING: There will be 2 midterm examinations, each worth 100 pts and a cumulative final exam worth 200pts. Two quizzes will be given during each section worth 25 pts each. Students will also be required to write a 5-page term paper and present their papers in front of the class. (term paper = 50pts; presentation= 50pts). Attendance and participation in class discussions will count for 100 points.
Total points possible = 750 points.

EXAM I	100 pts.	750 - 675 = A
EXAM II	100 pts.	674 - 600 = B
FINAL EXAM	200 pts.	599 - 525 = C
4 Quizzes (25pts. each)	100 pts.	524 - 450 = D
Student presentation/paper	100 pts.	< 449 = F
Challenge Questions	50 pts.	
Attendance and Participation	100 pts.	
Total Points = 750 pts.		

COURSE POLICIES

Your enrollment and attendance in this course automatically subjects you to course policies that have been established by the University. It is the STUDENT'S RESPONSIBILITY to follow the course policies. Brief descriptions of these policies are listed below. The University Handbook will be followed in cases where further clarification is needed. See http://www.wiu.edu/provost/students.php

PERSONAL HABITS: Some personal habits are distracting to others in the classroom and are disallowed. They include, but may not be limited to: holding conversations with others during lecture, text messaging, making or receiving phone calls, using personal electronic devices for gaming, using tobacco products, etc. Please respect those around you and limit these practices to personal time. You will be asked to leave the class if these habits are not controlled. See http://www.wiu.edu/vpas/policies/disrupst.php.

MAKE-UP EXAMS AND QUIZES: Make-up exams are only available if you are excused due to a university sponsored function (example: required field trip, athletic competition, etc.) or verified illness or death in the family. Advanced notice, when possible is expected, and if applicable, a physician's written verification of illness is required. No make-up quizzes will be offered.

ATTENDANCE: Participation from all the students in discussions is critical to the learning process. Attendance will be taken at each class and laboratory meeting. Each student will be allowed two excused absences with PRIOR PERMISSION of the instructor. Any other absences will result in a deduction of 10 points each. Participation and attendance will count for 100 pts towards your final grade. If at any time you have a family emergency, funeral, or just not feeling well, please use the OARS system to report your absence (www.wiu.edu/oars).

FIELD TRIPS: There will be a four scheduled field trips during the semester (**all dependent on COVID-19 restrictions**). The trips will be scheduled on Thursdays and will usually take up the entire day or most of the afternoon. If you have a scheduling conflict with another class, you will be responsible for making up any missed work. In the event a trip is canceled we will still have lab at the regularly scheduled time period and location.

ACADEMIC HONESTY: You are encouraged to work with your classmates in class and laboratory and study together in groups. However, exams must be completed independently. You are expected to maintain academic honesty as stated by the University. See http://www.wiu.edu/policies/acintegrity.php

STUDENTS WITH DISABILITIES: Students with disabilities: In accordance with University values and disability law, students with disabilities may request academic accommodations where there are aspects of a course that result in barriers to inclusion or accurate assessment of achievement. To file an official request for disability-related accommodations, please contact the Disability Resource Center at 309-298-2512, disability@wiu.edu or in 143 Memorial Hall. Please notify the instructor as soon as possible to ensure that this course is accessible to you in a timely manner.

UNIVERSITY VALUES: Title IX, and other federal and state laws prohibit sex discrimination, including sexual assault/misconduct, dating/domestic violence, and stalking. If you, or someone you know, has been the victim of any of these offenses, we encourage you to report this to the Title IX Coordinator at 309-298-1977 or anonymously online at: http://www.wiu.edu/equal_opportunity_and_access/request_form/index.php. If you disclose an incident to a faculty member, the faculty member must notify the Title IX Coordinator. The complete Title IX policy is available at: http://www.wiu.edu/vpas/policies/titleIX.php.

Attention Education Majors:
The changes within the Illinois State Teaching License requirements, students are required to receive a grade of a "C-" or better in this course in order to meet state requirements. With the university's +/- grading system, receiving a grade below a "C-" will require you to retake this course or find a substitute course to meet School of Agriculture graduation requirements.

** This is a tentative course outline and may be subject to change.

LECTURE, LABORATORY, AND EXAM SCHEDULE:

Date	Lecture Topic	Chapters
1/13, Mon.	Introduction to Plant Breeding	Chp 1.
1/15, Wed.	Genetic Variation and Gene Recombination	Chp 3.
1/16, Thurs.	**LAB 1-** Seed processing	
1/22, Wed.	Quantitative Inheritance	Chp 4.
1/23, Thurs.	**LAB 2-** Greenhouse planting	
1/27, Mon.	Heritability	Chp 4.
1/29, Wed.	**Quiz 1-** Chromosome numbers and mutation breeding	(Chps. 1,3,4 & Notes) Chp 5.
1/30, Thurs.	**LAB 3-** grapes and apples	Chp 6.
2/3, Mon.	Fertility regulation	Chp 7.
2/5, Wed.	Breeding self-pollinated crops	Chp 9.
2/6, Thurs.	**LAB 4 essential oils** -Plant factories	
2/10, Mon.	Clonal propagation	Notes
2/12, Wed.	**University closed – Lincoln's Birthday**	
2/13, Thurs.	**LAB 5 -** Micropropagation - mums	
2/17, Mon.	Clonal propagation	
2/19, Wed.	Reproduction in plants	Chp 2.
2/20, Thurs.	**LAB 6 -** flower structure, greenhouse crosses	
2/24, Mon.	**Quiz 2** Breeding cross-pollinated crops	Chp 10. Chps. 2,5-7, 9-10
2/26, Wed.	Cross-pollinated crops - Review	
2/27, Thurs.	**EXAM I**	Chps. 1-7, 9-11 & Notes
3/3, Mon.	Hybrid production	Chp 11.
3/5, Wed.	Breeding objectives	Chp 12.
3/6, Thurs.	**Field Trip – Pioneer, Adair**	**2-5pm**
3/10-14	**No Class - Spring Break**	
3/17, Mon.	Germplasm Resources	Chp 13.
3/19, Wed.	Breeding for physiological and morphological traits	
3/20, Thurs.	**LAB 7 -** GRIN exercise – **Library**	**Crop due date**
3/24, Mon.	**Quiz 3** - Breeding for resistance to insect and diseases	12-13 & Notes, Handout
3/26, Wed.	Breeding for abiotic stresses	
3/27, Thurs.	**Field Trip – Bayer Crop Sci., Washington, IA**	**All day**
3/31, Mon.	Breeding for compositional traits and added value	Handout
4/2, Wed.	Plant tissue culture	Chp. 8
4/3, Thurs.	**LAB 8-** Embryo rescue	
4/7, Mon.	**Quiz 4 -** Plant tissue culture	Chp. 8 & Notes
4/9, Wed.	Interspecfic hybridization/Protoplast fusion	
4/10, Thurs.	**LAB 9-** Seed Analyzer	
4/14, Mon.	Analytical chemistry pNMR/GC/NIR	Handout
4/16, Wed.	Seed production	Chp 23.
4/17, Thurs.	**Field Trip – Nature's Grace & Wellness**	**1-4pm**
4/21, Mon.	Variety protection	
4/23, Wed.	Exam review	
4/24, Thurs.	**EXAM II**	Chps. 8, 12-13,23, Notes
4/28, Mon.	Student Projects	
4/30, Wed.	Student Projects	
5/1, Thurs.	Student Projects, Exam Review	
5/7, Wed.	**FINAL EXAM, KH 207, 1:00pm**	Cumulative