

PLANT SCIENCE 4325/7325 - FIELD CROP BREEDING

INSTRUCTOR: Anne L. McKendry Ph.D.
Wheat Breeding and Genetics
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GENERAL DESCRIPTION: Plant Science 4325/7325 will involve the application of genetics and the plant sciences to the breeding and improvement of field crops. (3 credits)

Text: Principles of Plant Genetics and Breeding; Author: George Acquaah (Text Required)

OUTLINE:

1. Introduction - Plant Breeding in Agriculture
 - History
 - Achievements
2. General Biological Concepts: - Factors Influencing Choice of Plant Breeding Method
3. Genetic Principles:
 - Genetic characteristics of self- vs cross-pollinated crops
 - Genotype vs phenotype
 - Mendelian genetics vs quantitative inheritance
 - Heritability
 - Response to selection
 - Variation in chromosome number and structure
4. Germplasm Issues: Parental Selection:
 - Genetic resources for plant breeding.
5. Breeding Methods for Self-pollinated and Cross-pollinated Crops:
 - Pure-line breeding and mass selection
 - Pedigree method
 - Single seed descent
 - Backcross breeding
6. Haploid Breeding Techniques
7. Breeding Methods for Cross-pollinated Crops
 - Recurrent Selection Methods
 - Types of Testers
 - Selfing or S1 Recurrent Selection
 - Reciprocal Recurrent Selection
8. Commercial hybrids in self- and cross-pollinated species
 - Heterosis
 - Combining ability
 - Chemical Hybridizing Agents
 - Male Sterility - Cytoplasmic; Genetic
 - Photoperiod -sensitive genic male sterility (PGMS)
 - Temperature-sensitive genic male sterility (TGMS)

9. Selected Breeding Objectives:
10. Field Plot Technique
11. Cultivar release and commercial seed production: - from the breeder to the farmer:
 - Performance evaluation for crop cultivar release
 - Classes of seed
 - Plant Variety Protection

| EVALUATION: | 4325 | 7325 |
|--------------------|-------------|-------------|
| Assignments (4) | 20 points | 20 points |
| In class exam 1 | 20 points | 20 points |
| In class exam 2 | 20 points | 20 points |
| Paper | | 15 points |
| Final examination | 40 points | 40 points |
| Total | 100 points | 115 points |

GRADING SYSTEM

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|---|--------|
| A | 85-100 |
| B | 75-84 |
| C | 65-74 |
| D | 50-64 |

- (1) Fractions of a percentage point will be rounded to the nearest whole number.
- (2) Individual test/exams will **not** be curved; however, the instructor reserves the right to curve the final grades if it is appropriate to do so.

Academic integrity is fundamental to the activities and principles of a university. All members of the academic community must be confident that each person's work has been responsibly and honorably acquired, developed, and presented. Any effort to gain an advantage not given to all students is dishonest whether or not the effort is successful. The academic community regards breaches of the academic integrity rules as extremely serious matters. Sanctions for such a breach may include academic sanctions from the instructor, including failing the course for any violation, to disciplinary sanctions ranging from probation to expulsion. When in doubt about plagiarism, paraphrasing, quoting, collaboration, or any other form of cheating, consult the course instructor.

If you need accommodations because of a **disability**, if you have emergency medical information to share with me, or if you need special arrangements in case the building must be evacuated, please inform me immediately. Please see me privately after class, or at my office. To request academic accommodations (for example, a note taker), students must also register with the [Office of Disability Services](http://disabilityservices.missouri.edu), (<http://disabilityservices.missouri.edu>), S5 Memorial Union, 882-4696. It is the campus office responsible for reviewing documentation provided by students requesting academic accommodations, and for accommodations planning in cooperation with students and instructors, as needed and consistent with course requirements. For other MU resources for students with disabilities, click on "Disability Resources" on the MU homepage.

The University community welcomes **intellectual diversity** and respects student rights. Students who have questions concerning the quality of instruction in this class may address concerns to either the Departmental Chair or Divisional leader or Director of the Office of Students Rights and Responsibilities (<http://osrr.missouri.edu/>). All students will have the opportunity to submit an anonymous evaluation of the instructor(s) at the end of the course.

If you have any questions about academic integrity or intellectual pluralism, please feel free to contact Associate Vice Provost Michael Prewitt (882-1422) who oversees the Office of Student Rights and Responsibilities (<http://osrr.missouri.edu/>). For questions about ADA classroom accommodations, please contact the Office of Disability Services at 882-4696.