

**AGRI-376****- Applied Genetics in Agriculture -**

INSTRUCTOR: Dr. Win Phippen  
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CLASS: MW 1:00-1:50 KH 152  
 LAB 1: TH 1:00-2:50 KH 207  
 LAB 2: TH 3:00-4:50 KH 207

CREDITS: 3 hours  
 OFFICE HOURS: MW 12:00-1:00, TH 10:00-12:00 or by appointment.

TEXT: Essentials of Genetics, 10<sup>th</sup> ed. 2020. William S Klug, William Klug, Michael Cummings, Michael R Cummings, Charlotte Spencer, Charlotte A Spencer, Michael A Palladino, Michael Palladino, Darrell Killian.  
 ISBN: 0134898419

COURSE DESCRIPTION: This course is designed for Agriculture majors who are interested in developing their basic understanding of genetics, along with learning about the techniques and implications of manipulating genes in plant and animal systems. With the recent advances in cloning, genetic engineering and gene editing, understanding the genetics and the current molecular technology in genetics is critical for agriculture majors dealing with concerns of genetically modified organisms. It is also critical for agriculture majors to consider and understand the social implications of manipulating genes. Students will develop a basic understanding of: Mitosis and meiosis, DNA structure and replication, RNA transcription and protein translation, principles of classical genetics, control of gene expression, DNA mutations, methods for assessing genetic diversity, recent developments in genetic technology, and social implications of manipulating genetic information in agricultural organisms. GRADING: Four quizzes will be given throughout the semester each worth 25 pts. There will also be three midterm exams after each section, each worth 100 pts and a final exam worth 200pts. Student groups will be required to present a brief genetics paper in front of the class and hand-in a 2-page summary of their presentation with references. The presentation and paper are worth 100 pts (+10pts topic, +20 pts Outline). Homework will count for 50 points, while attendance and participation in class discussions will count for 100 points.

Quizzes (4 x 25pts/ea)	100
EXAM I	100
EXAM II	100
EXAM III	100
FINAL EXAM	200
Group Project	130
Homework	50
Attendance and Participation	100
Total Points	880

880 – 836	A
835 - 792	A-
791 - 766	B+
765 – 722	B
721 - 704	B-
703 - 678	C+
677 - 634	C
633 - 616	C-
615 - 599	D+
598 - 554	D
553-528	D-
< 527	F

## COURSE POLICIES

Your enrollment and attendance in this course automatically subject 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.

**HOMEWORK:** Presentations, papers, and homework MUST BE TYPED and handed in electronically at the beginning of the class period on the due date. Anything later will be considered late. Late papers will lose 10% of the grade for each day turned in late (including the day of class if you skip class that day).

**ATTENDANCE AND PARTICIPATION:** This course is now required for many students to complete their major. Participation from all the students in discussions is critical to the learning process. Attendance will be taken at each class and laboratory meeting. Students are required to sit in their designated seat during all face-to-face class sessions. Absence from class will be considered excused if the absence if the instructor receives notification through WIU Student Services. The student remains responsible for contacting the instructor to arrange to complete missed work as soon as possible and is ultimately responsible for material covered in class. 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](http://www.wiu.edu/oars)).

**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>

**MILITARY/VETERAN SUPPORT STATEMENT:** As a military-friendly institution, and in accordance with federal regulations and Illinois statutes, Western Illinois University has established policies and procedures to accommodate military service students. In addition to the supports available at WIU's Veterans Resource Center ([www.wiu.edu/studentsuccess/veterans](http://www.wiu.edu/studentsuccess/veterans) / 309-298-3505), veterans, members of the National Guard or Reserves, and active-duty military personnel with military obligations (e.g., deployments, trainings, drill) are encouraged to communicate these, in advance whenever possible, to the instructor. The Military Service Policy can be found at <http://www.wiu.edu/policies/military.php>

**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](mailto: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](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: [https://www.wiu.edu/policies/docs/WIU-D\\_H\\_SM-Policy.pdf](https://www.wiu.edu/policies/docs/WIU-D_H_SM-Policy.pdf)

### Attention Education Majors:

The changes within the state teaching license require all education majors to receive a grade of a "C-" or better in this course in order to meet Illinois teaching license requirements. With the university +/- grading system, receiving a "D+" or below will require you to retake this course or find a substitute course to meet School of Agriculture graduation requirements.

## LECTURE, LABORATORY AND EXAM SCHEDULE:

Date	Lecture Topic	Chapters, Due Dates
8/19, Mon.	Introduction to Genetics	
8/21, Wed.	History of Genetics	Chp. 1 p. 1-14
8/22, Thur.- LAB 1	Genetics overview videos	Check WO for links to 4 videos
8/26, Mon.	Cell and Chromosome structure, Mitosis	Chp. 2 p. 18-22, Chp.11 p. 225-232
8/27, Wed.	Mitosis	
8/28, Thur.- LAB 2	Mitosis-onion, Genetics Video	
<b>9/2, Mon.</b>	<b>Labor Day – No Class</b>	
9/4, Wed.	Student Projects – Agriculture application	
9/5, Thur.- LAB 3	Student Projects - Outline	<b>Project Outline- DUE – 10/2</b>
9/9, Mon.	Meiosis	Chp. 2 p. 23-34
9/11, Wed.	<b>QUIZ 1-</b> Mono, dihybrid cross	Chp. 3 p. 38-52, <b>Homework #1 DUE</b>
9/12, Thur.- LAB 4	Mendelian genetics, natural selection	Pond exercise, Handout
9/16, Mon.	Probability, Extens. of Mend. genetics	Chp. 4 p. 62-83
9/18, Wed.	Chromosome mapping, genetic approaches	Handout, <b>Homework #2 DUE</b>
<b>9/19, Thur.- LAB 5</b>	Probability and statistics, simple traits	Handout ( <b>Ag Alumni Panel</b> )
9/23, Mon.	DNA structure	Chp. 9 p. 182-200, <b>Group topic DUE</b>
9/25, Wed.	DNA structure and EXAM I Review	
9/26, Thur.- LAB 6	<b>EXAM I</b>	<b>Chapters 1-4, 11 &amp; Handouts</b>
9/30, Mon.	RNA	<b>Project Outline- DUE – 10/2</b>
10/2, Wed.	DNA replication	Chp. 10 p. 204-220.
10/3, Thur.- LAB 7	DNA structure and extraction	
10/7, Mon.	<b>QUIZ 2-</b> DNA replication	
10/9, Wed.	DNA replication	Telomerase pg 221 <b>Homework #3 DUE</b>
10/10, Thur.- LAB 8	Inheritance Study	
10/14, Mon.	Transcription	Chp. 12 p. 241-257, RNAi p. 257
10/16, Wed.	Translation	Chp. 13 p. 262-280
10/17, Thur.- LAB 9	Translation lab	
10/21, Mon.	Translation/Proteins	
10/23, Wed.	<b>QUIZ 3–</b> Mutations	Chp. 14 p 285-303
10/24, Thur.-LAB 10	Mutations- Mutator die	
10/28, Mon.	Regulation of genes, promoters	Chp 15 p308-329, <b>Homework #4 DUE</b>
10/30, Wed.	EXAM II review	
<b>10/31, Thur. LAB 11</b>	<b>EXAM II</b>	<b>Chapters 9-10, 12-15</b>
11/4, Mon.	Recombinant DNA technology	Chp. 17 p. 351-369, Chp. 18 review
11/6, Wed.	Applications of genetics	Chp. 19 p. 425-444
11/7, Thur.- LAB 12	Livestock Cloning Video	
11/11, Mon.	Genetics in Ag and industry	Chp 27 (handout)
11/13, Wed.	<b>QUIZ 4 -</b> Trends in Biotechnology	<b>Homework #5 DUE</b>
11/14, Thur.- LAB 13	DNA fingerprinting	
11/18, Mon.	Legal issues facing genetics	Chp. 28 (handout)
11/20, Wed.	Exam III review	
<b>11/21, Thur.-LAB 14</b>	<b>EXAM III</b>	<b>Chapters 17-19, 27-28 (handouts)</b>
<b>11/25-11-29</b>	<b>Fall Break</b>	
12/2, Mon.	Student presentations	
12/4, Wed.	Student presentations	
12/5, Thur.- LAB 15	Student presentations, Final Review	
<b>12/11, Wed.</b>	<b>FINAL EXAM, KH 152, 1:00pm</b>	Cumulative

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