Genetics
Zoology 3300
FALL SEMESTER 2016

Instructor: Jonathan Clark  (http://www.weber.edu/jonclark/)
Office: TY 413  Phone: 801-626-6171  E-mail: jclark1@weber.edu

Office hours: Monday and Thursday, 1:30 – 3:00 PM, and by appointment
Text:  *Principles of Genetics*, sixth edition, Snustad & Simmons
(older editions may be acceptable but you should correlate chapters and problems with the sixth edition)

COURSE FORMAT
Three lectures (M, W, F, 9:30 AM) and one three-hour laboratory (Wednesdays, 11:30 - 2:30 PM) per week. Successful students will spend a considerable amount of time outside of class studying and working on genetics problems from the text.

- All class communication will be done through your mail.weber.edu e-mail account so please check it regularly.
- Accessing mobile devices is a distraction to fellow students. Please be considerate of your classmates.

COURSE DESCRIPTION AND OBJECTIVES
This course is a detailed treatment of modern genetics including classical genetics, molecular genetics, and population genetics. Prerequisites include a basic understanding of biology, mathematics, and chemistry. Students will:
• develop a foundation in genetics and gain an appreciation of the breadth of the subject.
• enhance their quantitative thinking and problem-solving skills.
• gain experience with experimental genetics and the tools used to study genetics.
• learn to collect, analyze, and present experimental data.

GRADING
Lecture. There will be four exams given approximately during the fourth, eighth, and twelfth weeks of the semester and during finals week. Each exam is weighted equally and is worth 100 points. Exams are given in the Natural Sciences Testing Center. A 40-point assignment on Human Evolution is due by Nov. 14.

Laboratory. Laboratories will include a variety of exercises, including multi-week investigations of classical and molecular genetics. An 80-point lab report is due by Dec. 2. Attendance in laboratory is mandatory and each session will begin with a short quiz covering the lab and related material from class.

There are no make-up exams, make-up quizzes or extra credit

The final grade will be based on a total of 530 points, 400 for the lecture exams and assignment and 130 for the laboratories. The following scale is used:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>A</td>
<td>93 - 100%</td>
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<tr>
<td>A-</td>
<td>90 - 92%</td>
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<td>A+</td>
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<td>83 - 86%</td>
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<td>B+</td>
<td>80 - 82%</td>
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<td>B-</td>
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<td>73 - 76%</td>
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<td>C+</td>
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<td>D+</td>
<td>63 - 66%</td>
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<td>D-</td>
<td>60 - 62%</td>
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<td>E</td>
<td>&lt; 60%</td>
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# Genetics

**SEMESTER OUTLINE**

Lab exercises and papers are available at: http://www.weber.edu/jonclark/

<table>
<thead>
<tr>
<th>Activity</th>
<th>Date</th>
<th>Events</th>
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<tbody>
<tr>
<td><strong>MITOSIS (No Quiz)</strong></td>
<td>Aug. 31</td>
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<tr>
<td>Learn about mitosis by making and observing chromosome preparations from living cells.</td>
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<td><strong>APPLICATIONS OF PROBABILITY AND STATISTICS</strong></td>
<td>Sep. 7</td>
<td>Quiz 1</td>
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<tr>
<td>Observe the results of crosses done in maize and test genetic hypotheses using statistics.</td>
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<tr>
<td><strong>DROSOPHILA GENETICS I: IDENTIFYING PHENOTYPIC VARIATION</strong></td>
<td>Sep. 14</td>
<td>Quiz 2</td>
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<tr>
<td>Perform parental and F1 crosses in the model genetic organism, Drosophila.</td>
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<tr>
<td><strong>DROSOPHILA GENETICS II: ANALYSIS OF PHENOTYPIC VARIATION</strong></td>
<td>Sep. 21</td>
<td>Exam I this week</td>
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<tr>
<td>Observe the results of the F2 generation and use statistics to test genetic hypotheses.</td>
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<td><strong>RESTRICTION ENZYME ANALYSIS OF DNA I: DIGESTION</strong></td>
<td>Sep. 28</td>
<td>Quiz 3</td>
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<td>Set up restriction endonuclease digestions of bacteriophage lambda DNA.</td>
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<td><strong>No Class</strong></td>
<td>Oct. 5–10</td>
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<td><strong>RESTRICTION ENZYME ANALYSIS OF DNA II: ELECTROPHORESIS</strong></td>
<td>Oct. 12</td>
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<td>Learn how to visualize DNA and to estimate sizes of DNA fragments.</td>
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<td><strong>DNA CLONING I: BACTERIAL TRANSFORMATION</strong></td>
<td>Oct. 19</td>
<td>Exam II this week</td>
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<tr>
<td>Introduce plasmid DNA into E. coli and observe the phenotypic results of genetic transformation.</td>
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<td><strong>DNA CLONING II: PLASMID ISOLATION AND ELECTROPHORESIS</strong></td>
<td>Oct. 26</td>
<td>Quiz 4</td>
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<tr>
<td>Isolate, digest, and quantitatively analyze plasmid DNA.</td>
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<td><strong>MOLECULAR POPULATION GENETICS I: BACKGROUND AND SET-UP</strong></td>
<td>Nov. 2</td>
<td>Quiz 5</td>
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<tr>
<td>Isolate your own DNA and examine it with the most versatile genetic technique, PCR.</td>
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<td><strong>No Laboratory / No Class</strong></td>
<td>Nov. 7–11</td>
<td>Exam III this week</td>
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<td>See “Human Evolution” Exercise</td>
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<td><strong>HUMAN EVOLUTION assignment due By 9:30 AM today</strong></td>
<td>Nov. 14</td>
<td>Assignment Due</td>
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<td><strong>MOLECULAR POPULATION GENETICS II: ANALYSIS</strong></td>
<td>Nov. 16</td>
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<td>Determine your genotype and compare it to the population represented by your classmates.</td>
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<td><strong>Thanksgiving Break – No Laboratory / No Class</strong></td>
<td>Nov. 23–25</td>
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<td><strong>LABORATORY REPORT due By 9:30 AM today</strong></td>
<td>Dec. 2</td>
<td>Report Due</td>
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<td><strong>Last Day of Class</strong></td>
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<td><strong>Exam IV</strong></td>
<td>Dec. 12 – 14</td>
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* Identifies the four, multi-week major projects that may be written as a laboratory report

**EXPECTATIONS**

Students should view the statement of Student-Faculty Expectations on the Department of Zoology’s web site (http://www.weber.edu/Zoology/student_resources/expectations.html)