# Genetics

## BIOL2030

## Instructor Information

## Course Description

Prereq: BIOL 1610 w/C grade or better AND CHEM 1210 w/C grade or better. Coreq: BIOL 2035. For biology/science majors. An introduction to the principles of genetics. Topics include: transmission (Mendelian), molecular, and population genetics. Three hours of lecture per week with additional lab component (BIOL 2035) required.

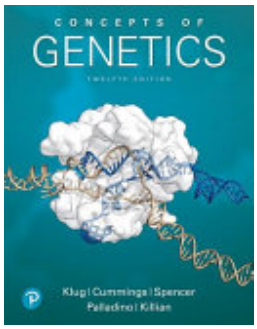
Semester: Fall & Spring

## Course Prerequisites

Pre-Requisite(s): BIOL 1610; CHEM 1210. These classes must have been successfully completed (with a grade of C or better).

Co-Requisite(s): BIOL 2035

## Required Textbook or Materials




**Title: Concepts of Genetics**
**ISBN:** 9780134604718
**Authors:** William S. Klug, Michael R. Cummings, Charlotte A. Spencer, Michael Angelo Palladino, Darrell Killian
**Publication Date:** 2019-01-01
**Edition:** 12th (The international edition or other editions of this book can be used as a substitute)

For more information on textbook accessibility, contact Accessibility & Disability Services at ads@slcc.edu.

## Course Presentation

We will devote time in class to summarize chapter information (using Powerpoint presentations) and for group problem solving activities. We will learn and practice logical thinking skills to solve story problems. Students are expected to come to class prepared to ask and answer questions.

## College Wide Student Learning Outcomes

SLCC has identified nine essential capacities all students should strengthen, regardless of academic major or career plans, that will serve students in all aspects of life.

- Acquire substantive knowledge in the intended major and throughout General Education
- Communicate effectively
- Develop quantitative literacies necessary for the chosen field of study
- Think critically
- Express themselves creatively

- Develop civic literacy and the capacity to be community-engaged learners who act in mutually beneficial ways with community partners
- Develop the knowledge and skills to work with others in a professional and constructive manner
- Develop information literacy
- Develop computer literacy

## Communication Plan

- I will respond to email within 2 business days. I will offer feedback on major assignments within1 week. The best way to contact me is via the Canvas Inbox, as I will prioritize this email over other modes of communication.
- In this course I will occasionally post announcements. This mode of communication will be used whenever I wish to contact everyone in the class
- Please bring your questions to class so that we can discuss them together. Your questions are more important than my lectures.

## Course Student Learning Outcomes

- An introduction to the principles of genetics. Topics include: transmission (Mendelian), molecular, and population genetics.

## Course Learning Environment

My hope is that all of us together will create a learning environment that supports a diversity of thoughts, perspectives and experiences, and honors your identities (including race, gender, class, sexuality, religion, ability, etc.) To help accomplish this:

- No discrimination is tolerated based on anyone's race, gender, sexuality, religion, abilities, English language proficiency or socio-economic circumstances. Please

always choose kindness and patience in our class communications, there is space for all of us here.

- If you have a name and/or set of pronouns that differ from those that appear in your Canvas handle, please let me know so I can address everyone in a way that makes them feel comfortable and safe.

- I (like many people) am still in the process of learning about diverse perspectives and identities. If something was said in any of the class materials and discussions (by anyone) that made you feel uncomfortable, please talk to me about it. You can email me directly or send feedback via the anonymous open survey on our Canvas site.

- If you feel like your performance in the class is being impacted by your experiences outside of class, please don't hesitate to let me know and request extra time on your course work. I want to be a resource for you and help you learn these materials without adding to anyone's level of stress and I promise to treat everyone with compassion.

## General Course Policies

**Attendance:**

**Academic Integrity:**

Generative artificial intelligence (AI) software is a rapidly emerging tool that students may be interested in using. If doing so, SLCC students are expected to adhere to the same standards as the Code of Student Rights and Responsibilities statement on plagiarism. Presenting generative AI software content as your own is a violation of academic integrity. If you use generative AI in your work, you must indicate that you have done so.

**Due Dates and Late Work Policy:** Due dates are important to help students keep up with class materials. I generally do not impose late penalties unless a student is chronically late in handing in assignments. The last opportunity to hand in assignments is one week late.

**Drop, Withdraw or Incomplete Grade**: Last day to drop from class with refund is September 10, withdraw without refund is October 22. A grade of "I" (Incomplete) is at the instructor's discretion and can be given if a student is facing extenuating circumstances preventing them from finishing the semester. In order to receive an incomplete, most of the course work must be completed (e.g. ~75%) with a passing grade.

**SLCC Academic Policies**: SLCC academic policies may be found in the SLCC 2023-2024 Catalog, and the Code of Student Rights and Responsibilities.

## Keys to Success

1. Genetics is a challenging course and will require regular study time outside of class. Please plan to spend at least 7 hours each week.

2. Get to know other class members and study together

3. It is important to keep up - it will be hard to catch up if you fall behind

4. Please come prepared to ask questions during class

5. Practice working on story problem questions and using mathematical tools to analyze data

6. Try to get beyond memorizing information by learning concepts that you can link together in logical fashion

## Free STEM Tutoring

STEM Learning provides free tutoring services and textbook checkout to students enrolled in various courses offered by the School or Science, Math, and Engineering.

Tutoring is provided as a drop-in service only, except in certain circumstances.

Please visit https://www.slcc.edu/stem/tutoring/index.aspx for more information!

## How to Navigate to Canvas

## Description of Assignments/Exams

You will receive one grade for the combination of BIOL 2030 and BIOL 2035. 80% of the points will come from BIOL 2030 and 20% from BIOL 2035. Total points = 600.

| | | |
|---|---|---|
| For BIOL 2030: | 4 sectional exams (90 points each): | 360 points |
| | 8 take home assignments (10 points each): | 80 points |
| | 20 in-class assignments (2 points each*): | 40 points |
| For BIOL 2035: | 10 pre-lab assignments (2 points each^): | 20 points |
| | 10 post-lab assignments (6 points each^): | 60 points |
| | 10 lab quizzes (4 points each^): | 40 points |

*26 total in-class assignments (students can miss 6 without penalty)

^total of 11 labs (students can miss one lab without penalty)

Students will work together to complete a group project which they are expected to present to the class or in a department or college setting (such as the Bruin Brains symposium). This will count 30 points towards exam 3.

## Grading Scale

Total points = 600

A: >93% > 558 A-: 90 - 93% 540 - 557 B+: 87 - 90% 522 - 539

B: 83 - 87% 498 - 521 B-: 80 - 83% 480 - 497 C+: 77 - 80% 462 - 479

C: 73 - 77% 438 - 461 C-: 70 - 73% 420 - 437 D+: 65 - 70% 390 - 419

D: 60 - 65% 360 - 389 E: <60% < 359

## Course Schedule

COURSE SCHEDULE

| Date | Chapter(s) covered | lab activity |
|---|---|---|
| Week 1 (Aug 21) | Syllabus and Chapter 2: Cell Division | |
| Week 2 (Aug 26) | Ch 2/3: Meiosis/Genetics | |
| (Lab) | Lab 1: (related to Chapters 2, 8) | 1) Chromosome Mutations |
| (Aug 28) | Chapter 3: Mendelian Genetics | |
| Week 3 (Sep 2) | Martin Luther King Holiday | |
| (Sep 4) | Chapter 8: Chromosomal Mutations | |
| Week 4 (Sep 9) | Chapter 4: Extensions of Mendel | |
| (Lab) | Lab 2: (related to Chapter 3) | 2) Probability/Chi-Square |
| (Sep 11) | Chapter 4: Extensions of Mendel | |
| Week 5 (Sep 16) | Chapter 7: Sex Determination and Sex Chromosomes | |

(Lab) Lab 3: (related to Chapters 3, 7) 3) Fruit Fly Crosses

(Sep 18) Chapter 9: Extranuclear Inheritance and Test Review

Week 6 (Sep 23) Chapter 10: DNA Structure

(TEST 1 during lab time) Test 1 Ch 2 – 4, 7 – 9

(Sep 25) Chapter 11: DNA Replication

Week 7 (Sep 30) Chapter 12: DNA Organization in Chromosomes

(Lab) Lab 4: (related to Chapter 10) 4) DNA Quantitation

(Oct 2) Chapter 13: Transcription

Week 8 (Oct 7) Chapters 17 & 18: Transcriptional Regulation

(Lab) Lab 5: (related to Chapters 10, 20) 5) DNA isolation/PCR

(Oct 9) Chapter 13: Genetic Code

Week 9 (Oct 14) Chapter 14: Translation

(Lab) Lab 6: (related to Chapters 13, 14, 21) 6) Bioinformatics

(Oct 16) Group Projects

Week 10 (Oct 21) (TEST 2) Test 2: Ch 10 – 14, 17, 18

(during lab time) Chapter 20: Recombinant DNA Technology

(Oct 23) Chapter 20: Recombinant DNA Technology

Week 11 (Oct 28) Chapters 20 & 21: Rec DNA Technology and DNA Sequencing

(Lab) Lab 7: (related to Chapter 20) 7) Mystery Plasmid

(Oct 30) Chapter 21: Genomic Analysis

Week 12 (Nov 4) Ch 22 & Spec Topics: Genetic Engineering/Gene Therapy/DNA Forensics

(Lab) Lab 8: (related to Chapter 20) 8) Restriction Mapping

(Nov 6) CRISPR-Cas and Chapter 24: Cancer Genetics/Test Review

Week 13 (Nov 11) (TEST 3) Test 3 Ch 20 – 24, Special Topics

(Lab) Lab 9 (related to chapter 21) 9) Genomic DNA Libraries

(Nov 13) Ch 15: Mutations and DNA Repair

Week 14 (Nov 18) Ch 25: Quantitative Genetics

(Lab) Lab time will be devoted to Group Projects

(Nov 20) Ch 26: Population Genetics

Week 15 (Nov 25) Ch 26: Population Genetics

(Lab) Lab 10: (related to Chapter 26) 10) Population Genetics

(Nov 27) Thanksgiving Holiday

Week 16 (Dec 2) Ch 5: Genetic Linkage

(Lab) Lab 11: (related to Chapter 5) 11) Genetic Linkage

(Dec 4) Group Project Presentations

Finals Week (Monday, Dec 9) Test 4 at 9:00 am Ch 5, 15, 25, 26

## Institutional Policies

As members of our academic community, we would like to invite you to review the Institutional Syllabus which covers important policies and procedures. This document contains important links for students on the code of student rights and responsibilities, academic integrity, and grading policies, Title IX and other important acknowledgements. By familiarizing yourself with this information, you can help us create a safe and respectful environment for everyone.

You can access the document by clicking on the following link: https://slcc.instructure.com/courses/530981/pages/institutional-syllabus

## Learning Support and Tutoring Services

We are pleased to offer a range of tutoring and learning support services to help you achieve your academic goals. Whether you need assistance with a specific subject or want to improve your study skills, you have many options for tutoring or other support.

To learn more about the services we offer and how to access them, please visit the Institutional Syllabus under the Tutoring and Learning Support tab: https://slcc.instructure.com/courses/530981/pages/institutional-syllabus. We encourage you to take advantage of these resources to help you succeed in your studies. If you have any questions or would like to schedule a tutoring session, please don't hesitate to reach out to us. We are here to support you in any way we can.

## Student Academic Calendar

As students you should be aware of all important dates in the semester, such as the day that courses begin and end, as well as the drop date and the last day to withdraw. To

learn more about those dates, navigate to the Student Academic Calendar below:

SLCC Student Academic Calendar

## Advising and Counseling Support Services

At our institution, we are committed to supporting your academic and personal growth. That's why we offer a range of advising and counseling services to help you navigate the challenges of college life. To learn more about the resources available to you and how to access them, please visit the Institutional Syllabus under the Advising and Counseling Support Services tab: https://slcc.instructure.com/courses/530981/pages/institutional-syllabus. Our advising team and the support centers across campus are here to support you in achieving your goals and overcoming any obstacles you may face.

## Assignment Schedule

| Due Date | Assignment Name | Assignment Type | Points |
|---|---|---|---|
| | Ch 10 - 12, labs 5 & 6 Discussion Board | Discussion | 0 |
| | Ch 13 - 18, Lab 7 Discussion Board | Discussion | 0 |
| | Ch 2 & 3 and Lab 1, 2 and 3 Discussion | Discussion | 0 |
| | Ch 20 and Labs 7 and 8 Discussion | Discussion | 0 |
| | Ch 4, 7, 8, 9 discussion | Discussion | 0 |
| | Chapters 21, 22 & 24, Lab 9 Discussion | Discussion | 0 |
| | Chapters 5, 15 and lab 11 Discussion | Discussion | 0 |

| Due Date | Assignment Name | Assignment Type | Points |
|---|---|---|---|
| | Introduce Yourself | Discussion | 0 |
| | Population Genetics and Polygenic inheritance Discussion | Discussion | 0 |
| 8/26 | Aug 26 assignment | Assignment | 2 |
| 8/26 | Meiosis and Chromosomal Mutations preLab Assignment | Assignment | 2 |
| 8/28 | Aug 28 Assignment | Assignment | 2 |
| 9/4 | Sep 4 Assignment | Assignment | 2 |
| 9/9 | Meiosis and Chromosomal Mutations Lab Quiz | Quiz | 4 |
| 9/9 | Ch 2, 3 & 8 Assignment | Assignment | 10 |
| 9/9 | Meiosis and Chromosomal Mutations postlab assignment | Assignment | 6 |
| 9/9 | Probability and Chi-Square prelab assignment | Assignment | 2 |
| 9/9 | Sep 9 Assignment | Assignment | 2 |
| 9/11 | Sep 11 Assignment | Assignment | 2 |
| 9/16 | Probability and Chi-Square Lab Quiz | Quiz | 4 |

| Due Date | Assignment Name | Assignment Type | Points |
|---|---|---|---|
| 9/16 | Fruit Fly Crosses preLab Assignment | Assignment | 2 |
| 9/16 | Probability and Chi-Square Postlab assignment | Assignment | 6 |
| 9/16 | Sep 16 Assignment | Assignment | 2 |
| 9/18 | Sep 18 Assignment | Assignment | 2 |
| 9/23 | Ch 4, 7, & 9 Assignment | Assignment | 10 |
| 9/23 | Sep 23 assignment | Assignment | 2 |
| 9/25 | Sep 25 | Assignment | 2 |
| 9/30 | Fruit Fly Crosses Lab Quiz | Quiz | 4 |
| 9/30 | DNA Quantitation preLab Assignment | Assignment | 2 |
| 9/30 | Sep 30 | Assignment | 2 |
| 10/2 | Oct 2 | Assignment | 2 |
| 10/7 | DNA Quantitation Lab quiz | Quiz | 4 |
| 10/7 | Ch 10 - 12 Assignment | Assignment | 10 |
| 10/7 | DNA isolation and PCR prelab assignment | Assignment | 2 |
| 10/7 | DNA Quantitation Assignment | Assignment | 6 |
| 10/7 | Fruit Fly Crosses postlab assignment | Assignment | 6 |

| Due Date | Assignment Name | Assignment Type | Points |
|---|---|---|---|
| 10/7 | Oct 7 | Assignment | 2 |
| 10/9 | Oct 9 | Assignment | 2 |
| 10/14 | DNA isolation and PCR Lab Quiz | Quiz | 4 |
| 10/14 | Bioinformatics preLab Assignment | Assignment | 2 |
| 10/14 | DNA isolation and PCR Assignment | Assignment | 6 |
| 10/14 | Oct 14 | Assignment | 2 |
| 10/16 | Oct 16 | Assignment | 2 |
| 10/21 | chapter 13, 14, 17, 18 Assignment | Assignment | 10 |
| 10/21 | Oct 21 | Assignment | 2 |
| 10/23 | Oct 23 | Assignment | 2 |
| 10/28 | Bioinformatics Lab Quiz | Quiz | 4 |
| 10/28 | Bioinformatics Lab Assignment | Assignment | 6 |
| 10/28 | Mystery Plasmid preLab Assignment | Assignment | 2 |
| 10/28 | Oct 28 | Assignment | 2 |
| 10/30 | Oct 30 | Assignment | 2 |
| 11/4 | Mystery Plasmid Quiz | Quiz | 4 |
| 11/4 | Chapter 20 assignment | Assignment | 10 |

| Due Date | Assignment Name | Assignment Type | Points |
|---|---|---|---|
| 11/4 | Mystery Plasmid Assignment | Assignment | 6 |
| 11/4 | Nov 4 | Assignment | 2 |
| 11/4 | Restriction Mapping preLab Assignment | Assignment | 2 |
| 11/6 | Nov 6 | Assignment | 2 |
| 11/11 | Restriction Mapping Quiz | Quiz | 4 |
| 11/11 | Chapters 21, 22 & Sp Tpc Assignment | Assignment | 10 |
| 11/11 | Genomic DNA Library Prelab Assignment | Assignment | 2 |
| 11/11 | Restriction Mapping Assignment | Assignment | 6 |
| 11/13 | Nov 13 | Assignment | 2 |
| 11/18 | Genomic DNA Library Quiz | Quiz | 4 |
| 11/18 | Genomic DNA Library Assignment | Assignment | 6 |
| 11/18 | Nov 18 | Assignment | 2 |
| 11/20 | Nov 20 | Assignment | 2 |
| 11/25 | Chapters 15 & 25 Assignment | Assignment | 10 |
| 11/25 | Nov 25 | Assignment | 2 |
| 11/25 | Population Genetics preLab assignment | Assignment | 2 |

| Due Date | Assignment Name | Assignment Type | Points |
|---|---|---|---|
| 12/2 | Population Genetics Quiz | Quiz | 4 |
| 12/2 | Dec 2 | Assignment | 2 |
| 12/2 | Genetic Mapping preLab Assignment | Assignment | 2 |
| 12/2 | Population Genetics Assignment | Assignment | 6 |
| 12/9 | Genetic Mapping Quiz | Quiz | 4 |
| 12/9 | Chapters 5 & 26 Assignment | Assignment | 10 |
| 12/9 | Genetic Mapping Assignment | Assignment | 6 |