

BIO 201 GENETICS (Course ID 022693, Class Number 5318, Section Number 0001)
Course Meeting Room: 165 Science Building (John S. Ricci Lecture Hall)
Course Meeting Times: Tuesdays & Thursdays; 3:30PM - 4:45PM
Course Meeting Mode: In Person (Masks Required)

Instructor: Ken Weber

Office Location: Room 212, Science Building

Email: keweber@maine.edu

Office Phone: 207-780-4265

Office Hours and Access: My office hours are Monday, Tuesday and Wednesday, from 11:30 AM to 1:00 PM, and from 5:00 PM to 5:30 PM. I'm available in my office at those times, or you can just call me at my office (207-780-4265), and you can also email me any time (keweber@maine.edu). I can also schedule Zoom meetings with one or more people, at a mutually convenient time, which can be on the weekend. Please note that I have no office hours on the same day as an exam.

Course Materials & Books:

There are two textbooks for this class, but both of them are optional. The first book is *Biology* by Campbell. This is the USM introductory biology textbook, so maybe you already own it. It's a good book to have for studying the basics of Genetics. You probably have already had some basics, and there are additional basics that you probably haven't had yet, but that we will cover. Campbell will be useful in this class. I've put some copies of Campbell in the library. If you want to borrow one of those copies, ask me about that and I'll contact the library. The other book is *Essential Genetics* by Hartl. It's a good cheap genetics textbook, but you won't actually need it. So despite its name, it's not essential in this class.

For Campbell, you can use either the 8th, 9th, 10th, or 11th edition. For Hartl you can use either the 3rd, 4th, 5th or 6th edition. New textbook editions come out every 3-4 years, but they don't change much. You can do very well with old, used editions purchased cheaply online from Amazon. If you use these books, the best approach is to check the readings given in the outline below, after each class meeting, and focus on the specific parts that I talked about in the class.

How important are the readings? Campbell is more important. But you can make an A in this class without using any books. Everything is in the handouts and the lectures. Tests will include only material that was covered in class.

Technology Requirements: Just the capability to handle email. Announcements go out by email.

Course Description, including format:

BIO 201 Genetics is a basic course in how genes and genomes are organized, transmitted and expressed. It also includes some advanced topics in genetics at the end, as far as time permits. This semester it will be taught in person, but during the semester there is a possibility that it will have to be converted into an online, live, synchronous course via Zoom. If our meetings are by Zoom, they will be recorded and posted on BrightSpace. Prerequisite: a grade of C- or higher in BIO 105 or BIO 111; or permission of instructor. Cr 3.

Learning Outcomes:

Our objectives are to understand the structure of genes, how they are packaged in chromosomes, how they are transmitted, how they function, how they are regulated, and how together they produce the features of whole organisms, in prokaryotes and in complex eukaryotes like humans.

Class Schedule of Meetings and Exams:

The outline below is based on the topics that we usually cover. This outline may change. I will inform the class of any major changes. Course meetings and exams will always occur at the scheduled meeting times for the class, as given above. The specific dates of exams are given in the lecture outline below.

Part I. Basic Genetics: ~10 Meetings

1. Introductory Molecular Genetics: Proteins & DNA

Campbell's *Biology*: Chapter sections 5.4 & 5.5, in any edition.

Hartl's *Essential Genetics*: Chapter sections 1.1 & 1.2, in any edition.

2. Introductory Cytogenetics: Chromosomes in Mitosis & Meiosis

Campbell's *Biology*: Chapters 12 & 13 (except section 12.3), in any edition.

Hartl's *Essential Genetics*: Chapter 3 (except section 3.7), in any edition.

3. Modes of Gene Action in Diploids: How Genes Produce Traits

Campbell's *Biology*: Chapter section 14.4, in any edition: read the parts titled "Recessively Inherited Disorders" & "Dominantly Inherited Disorders."

Hartl's *Essential Genetics*: Chapter sections 1.4, 1.5 & 1.6, in any edition. Also in Hartl: Look up "complementation" in the index, and read those pages. This particular material is in different chapter sections depending on the edition.

4. Single- and Multi-Gene Transmission Patterns: Mendel's Laws of Segregation

Campbell's *Biology*: Chapter 14, in any edition.

Hartl's *Essential Genetics*: Chapter 2, in any edition.

5. Multiple-Gene Transmission Patterns With and Without Linkage

Campbell's *Biology*: Chapter section 15.3, in any edition.

Hartl's *Essential Genetics*: Chapter sections 4.1 & 4.2, in any edition.

6. Sex Determination, Sex Chromosomes and Sex Linkage

Campbell's *Biology*: Chapter section 15.2, any edition.

Hartl's *Essential Genetics*: (Not well covered; some references to sex determination can be found in the index.)

7. Allele Frequencies in Populations

Campbell's *Biology*: (Campbell has no useful coverage of allele frequencies for our purposes.)

Hartl's *Essential Genetics*: In the 3rd edition, sections 14.1 & 14.2. In the 4th, 5th & 6th editions, sections 14.2 & 14.3.

FIRST EXAM: Tuesday, October 5, 2021 (3:30PM - 4:45PM)

(The 1st exam covers all the lectures up to this point.)

(The last day you can drop the class with an automatic grade of W is Friday, November 12, 2021.)

Part II. Cytogenetics and Molecular Genetics: ~9 Meetings

1. Chromosomal Systems of Eukaryotes

Campbell's *Biology*: Chapter sections 15.4 and 16.3, in any edition.

Hartl's *Essential Genetics*: Chapter sections 5.1, 5.2, 5.3 & 5.4, in any edition.

2. Molecular Genetics

Campbell's *Biology*: Chapter sections 16.2, and 17.1, 17.2, 17.3 & 17.4, in any edition.

Hartl's *Essential Genetics*: For DNA & Replication—Chapter sections 6.2, 6.3, 6.4 & 6.5, in any edition.

Hartl's *Essential Genetics*: For Transcription & Translation— If you have the 4th, 5th or 6th edition of Hartl, read all of chapter 8. If you have the 3rd edition, read chapter 9 instead.

3. Genetic Regulation

Campbell's *Biology*: Chapter sections 18.1, 18.2 & 18.3, in any edition.

Hartl's *Essential Genetics*: If you have the 4th, 5th or 6th edition of Hartl, read Chapter 9, except for section 9.8. If you have the 3rd edition, read Chapter 10, except for section 10.8.

SECOND EXAM: Tuesday, November 16, 2021 (3:30PM - 4:45PM)

(The 2nd exam covers all lectures after the 1st exam, up to this time.)

Part III. Topics in Genetics: ~6 meetings (Topics in this part may vary.)

1. Immunogenetics

Campbell's *Biology*: Chapter sections 43.2 & 43.3, in any edition.

Hartl's *Essential Genetics*: Chapter section titled "Some Developmental Processes Are Controlled by Programmed DNA Rearrangements." It's on pages 396-398 in 3rd edition; pages 345-348 in 4th edition; pages 324-325 in 5th edition; or pages 325-327 in 6th edition.

2. Mutation and Mutation Repair (2 meetings)

Campbell's *Biology*: Chapter section 17.5, in any edition.

Hartl's *Essential Genetics*: In the 3rd edition, Chapter 7. In the 4th, 5th and 6th editions, Chapter 12.

3. The Genetics and Cytogenetics of Cancer (2 meetings)

Campbell's *Biology*: Chapter section 18.5, in any edition.

Hartl's *Essential Genetics*: Chapter 13, in any edition.

COMPREHENSIVE FINAL (3rd) EXAM: Tuesday, December 14, 2021, 2:00-4:00 PM

The final exam will be comprehensive, but with disproportionate emphasis on Part III.

TESTING AND GRADING

Testing:

Tests and quizzes are based only on what is actually covered in class. There will be three exams, including two during the semester, and the final exam. The exams will consist mainly of short-answer essay questions and brief calculations. Each of the three exams will count as one third of the course grade. The exams will be given at the times shown in the lecture outline.

After each exam, I will post a scale on BrightSpace showing how letter grades correspond to numerical scores. Answer keys will be posted for exams and quizzes. Final exams will not be posted, or returned, but students may visit my office and go over their finals. If USM closes for any reason (snow, bomb threat, etc.) on the day of a test, the test will be given at the next class meeting. Aside from that, if an exam is rescheduled, I will always announce it.

Additional Graded Work:

There may be additional graded work in the form of homework problems, in-class exercises, quizzes (perhaps not announced), or assigned writings. Any such graded work will be combined with the next following exam, as part of the available points on that exam.

Missing Tests or Homework:

If you miss a scheduled test, you will not necessarily be allowed to make it up. You must have a reason why you could not take it when everyone else did. If your absence was foreseeable, you must have contacted me in advance. No tests will be given early. Late tests must be taken before the answers are posted. You can find out if you missed a new homework assignment by checking the HOMEWORK folder on BrightSpace.

Please don't ask to reschedule an exam unless there is no way you can take it at the scheduled time. If you have a documentable and compelling reason why you had to miss an exam, and you only miss one, you may be graded only on the other two exams. Otherwise a skipped exam is a failed exam, except in extraordinary circumstances beyond your control. If you have a job that conflicts with class times, it's up to you to arrange with your employer ahead of time, so that you can take exams at the scheduled times.

Grading and Scaling:

Letter grades on each exam are scaled to adjust for difficulty. For each of the three exams, the total points earned will be converted to a letter grade according to a scale based on percent, but not in the usual way. Approximately the top 15% of the class will get above B+; approximately the bottom 15% of the class will get below C-minus. After these upper and lower cut-offs are determined, letter grades will then correspond to equal intervals on the scale of total points. I will post the scale for each exam, so that the class can see how letter grades were determined. This approach to grading is called scaling, or grading "on the curve." It works best for big classes that have been taught often enough to know what to expect. It means the tests can never be too hard, or too easy, because there will always be a top 15% and a bottom 15%. I also adjust those percentages somewhat, as warranted by the general level of class performance.

The final course grade will be an average of the letter grades for the three exams. To find the average, I convert the letter grades to integers with A=11, A- =10, B+=9, etc.

Practice Homework:

Homework that is just for practice has been posted on Brightspace, mainly for the content that is covered in the first part of the course. It consists of quizzes and other exercises, and the answers are included at the end of each homework, so that you can test your skills and knowledge. This homework will not be graded. It's up to you whether you do it or not. I recommend that you do it, as we go along.

Re-Grades and Clarifications of Grading on Tests or Quizzes

All discussions about graded materials will be in writing. If you want a clarification or a re-grade on anything, first read the answer key posted on BrightSpace. If you still have questions, return your original test to me. Circle the things you want me to explain. Add your email address. You may also attach or email a written statement. I will email you a full and complete explanation. (You are free to respond to my explanation by email if you want to continue the discussion.) I may change your grade. You have one week after the answers are posted to ask for either a re-grade, or a clarification.

There are no extra-credit projects or make-up work. The class is too large to allow extra-credit projects or make-up work. Please don't ask me to make special arrangements, or to create special projects, so that you can raise your grade.

COURSE POLICIES

ATTENDANCE POLICY

I won't take attendance. You can decide for yourself whether to participate in the live meetings. If major issues arise in your life, threatening your ability to succeed in the class, you should let me know as soon as possible, so that we can try to work out a way for you to deal with the problem and make it through the class with something to show for your efforts, if possible.

ATTENDANCE POLICY: Inclement Weather

From time to time USM may close the University due to bad weather or other reasons. If classes are closed at the same time as an exam, the exam will be postponed until the next scheduled meeting time.

When the school opens late or closes early, and the time selected is during the middle of class, we will still hold the class unless you are otherwise notified by me. Two examples:

- If class starts at 1pm, but the University is closing at 1:30pm, we will still have class unless you hear from me.
- If class starts at 1pm, but the University is opening at 1:30pm, we will still have class unless you hear from me.

CLASS CANCELLATION

If I ever have to cancel class, I will notify everyone by email.

DISTRACTIONS IN CLASS

Please do not disturb the class by talking to neighbors or eating. Realize that these actions are annoying and distracting to many students. If you need to talk or eat, you can leave the class and return when you are finished. In class, hot or cold beverages are OK, and small pieces of candy are OK, if these things are unobtrusive and quiet. Points will be deducted from people who disregard this.

ACADEMIC INTEGRITY / PLAGIARISM

Any breach of academic integrity is a serious offense. Each student has a responsibility to know the standards of conduct and expectations of academic integrity that apply to academic tasks. Violations of academic integrity include any actions that attempt to promote or enhance the academic standing of any student by dishonest means. Cheating on an examination, stealing the words or ideas of another (i.e., plagiarism), making statements known to be false or misleading, falsifying the results of one's research, improperly using library materials or computer files, or altering or forging academic records are examples of violations of this policy. Acts that violate academic integrity disrupt the educational process and are not acceptable.

Evidence of a violation of the academic integrity policy will normally result in disciplinary action. A copy of the complete policy may be obtained from the office of Community Standards and Mediation, online at usm.maine.edu/community-standards-mediation/academic-integrity or by calling and requesting a copy at (207) 780-5242.

FINAL EXAMINATIONS/FINAL PROJECT

There will be a final exam in this class, given during the final exam period, on Tuesday, December 14, 2021, 2:00-4:00 PM. The exam will include questions from the whole semester, but it will put relatively more emphasis on the material covered after the second exam. There will be no final paper or projects.

It is a USM academic policy that no tests or exams may be scheduled during the last week of classes.

UNIVERSITY POLICIES AND RESOURCES

COVID FACE COVERING REQUIREMENT

Protective masks are required by the University of Southern Maine in all classes. Per USM and the University of Maine System, all students, faculty, and staff members are required to wear a face covering, including during all face-to-face classes. Resident students are exempted from this requirement when in their own room in the residence hall. Students seeking additional exceptions from this requirement should refer to the DISABILITY ACCOMMODATIONS section of this syllabus. <https://www.maine.edu/together/community-guidance/everyone/>

DISABILITY ACCOMMODATIONS

The university is committed to providing students with documented disabilities equal access to all university programs and services. If you think you have a disability and would like to request accommodations, you must register with the Disability Services Center. Timely notification is essential. The Disability Services Center can be reached at 207-780-4706 or at dscusm@maine.edu. If you have already received a faculty accommodation letter from the Disability Services Center, please provide me with that information as soon as possible. Then please contact me so that we can review your accommodations.

TUTORING AND WRITING ASSISTANCE

Tutoring at USM is for *all* students, not just those who are struggling. Tutoring provides active feedback and practice, and is available for writing, math, and many more subjects. Walk-in tutoring is available at the Glickman Library in Portland, the Gorham Library, and the LAC Writing Center. For best service, we recommend making an appointment at <https://usm.maine.edu/learningcommons/schedule-tutoring-appointment>. Questions about tutoring should be directed to Naamah Jarnot at 207-780-4554. Interested in becoming a more effective, efficient learner? Check out <https://usm.maine.edu/agile!>

COUNSELING

Counseling is available at USM. The best way to schedule an appointment is by phone at 780-5411. More information is available at <https://usm.maine.edu/uhrs>.

RECOVERY ORIENTED CAMPUS CENTER (ROCC)

A peer support community for students in recovery from substance abuse and other mental health conditions is available at USM. More information may be found online at <https://usm.maine.edu/recovery> or by contacting ROCC at 207-228-8141.

NONDISCRIMINATION POLICY AND BIAS REPORTING

The University of Southern Maine is an EEO/AA employer, and does not discriminate on the grounds of race, color, religion, sex, sexual orientation, transgender status, gender expression, national origin, citizenship status, age, disability, genetic information or veteran's status in employment, education, and all other programs and activities. The following person has been designated to handle inquiries regarding non-discrimination policies: Amie Parker, Interim Director of Equal Opportunity, The Farmhouse, University of Maine Augusta, Augusta, ME 04333, 207.581.1226, TTY 711 (Maine Relay System). Incidents of discrimination or bias at USM should be reported to Associate Vice President for Student Affairs David Roussel at 207-780-5242.

STATEMENT ON RELIGIOUS OBSERVANCE FOR USM STUDENTS

Absence for Religious Holy Days: The University of Southern Maine respects the religious beliefs of all members of the community, affirms their rights to observe significant religious holy days, and will make reasonable accommodations, upon request, for such observances. If a student's religious observance is in conflict with the academic experience, they should inform their instructor(s) of the class or other school functions that will be affected. It is the student's responsibility to make the necessary arrangements mutually agreed upon with the instructor(s).

TITLE IX STATEMENT

The University of Southern Maine is committed to making our campuses safer places for students. Because of this commitment, and our federal obligations, faculty and other employees are considered mandated reporters when it comes to experiences of interpersonal violence (sexual assault, sexual harassment, dating or domestic violence, and stalking). Disclosures of interpersonal violence must be passed along to the University's Deputy Title IX Coordinator who can help provide support and academic remedies for students who have been impacted. More information can be found online at <http://usm.maine.edu/campus-safety-project> or by contacting Sarah E. Holmes at sarah.e.holmes1@maine.edu or 207-780-5767.

If students want to speak with someone confidentially, the following resources are available on and off campus: University Counseling Services (207-780-4050); 24 Hour Sexual Assault Hotline (1-800-871-7741); 24 Hour Domestic Violence Hotline (1-866-834-4357).

POLICY ON ACCEPTABLE CONDUCT IN CLASS SETTINGS

If a student substantially disrupts a class, the professor may ask the student to align with this policy on conduct in a class setting. If the student refuses, the professor may, at their discretion, ask the student to leave. If the professor takes this step, they must attempt to communicate with the student and provide informal counsel and advice. The professor may elect to notify their dean of the situation as well. If the student disrupts the class again, the professor may, at their discretion, provide a written notification to the student, describe the offending behavior, and refer the student's case to the appropriate academic dean and notify the dean of students that an official student conduct code violation has occurred [<https://usm.maine.edu/community-standards-mediation/conduct-process>].