

Course Syllabus

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BIOLOGY 222: Principles of Genetics, Fall 2021

The BIOL 222 course will be held in person (Bailey 101; section 01 9:30-10:20 am, section 02 10:30-11:20 am). Please see [SUNY Geneseo guidelines \(https://www.geneseo.edu/fall-2021\)](https://www.geneseo.edu/fall-2021) for vaccination, masking, and COVID19 testing policies. Please also be aware that due to the dynamic nature of the COVID19 pandemic, it is possible that some changes to the syllabus and/or content delivery mode will need to be made after the semester has started. If this is the case, be assured that my priorities are student success, course continuity, and accessibility of information.

Prerequisites: Biology 117*, Biology 119*, Math 112 or Math 221; CHEM 118 or CHEM 211. *If biology students have a D or below in Biology 117 and Biology 119, they will be deregistered from BIOL 222

Instructor

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 **Office hours:** Mon and Wed 11:30-12:30 pm, and Thurs 11:00-12:00. All office hours will be held virtually via Zoom for COVID-19 safety considerations. Click on "Zoom" on the left side of the Canvas page to access the Zoom links for office hours. If you would like to speak with me in person you are welcome to do so, and can make an appointment via email.

Tutors

Information for the tutors will be posted soon; we will have two tutors for the course.

Course Description

Principles of Genetics will provide students with a broad genetics background, and will cover topics ranging from understanding the flow of genetic information within single-celled organisms to how genes and gene products function within multicellular organisms.

Overall Course Learning objectives

*Students will be able to define basic genetics terms, and use these terms to explain fundamental concepts in genetics related to: nucleic acid structure, the central dogma, gene regulation in eukaryotes and prokaryotes, transmission genetics, and molecular genetics.

*Students will be able to describe specific examples of how advances in our understanding of genetics and molecular biology have impacted society

*Students will gain experience analyzing and interpreting data from genetics experiments, both from historical experiments and current genetics methods. In addition, students will be able to explain how model organisms are used to understand genetics principles, providing specific examples.

Required Textbook

Genetics: Analysis and Principles (6th Ed) (McGraw Hill, ISBN 9781259616020) by Robert J. Brooker. This text is available in the bookstore. Please note: if you'd like to use an older edition or international edition of the text, students have done so successfully in the past. However, you will be responsible for material in the required text, which may differ from other versions.

Calculator

You'll need a simple calculator (no graphing calculators allowed) for exams in this course.

Grading

Assignment	How many?	Percentage
Exams	5	70%
Final Presentation	1	10%
Homework Assignments	5 (1 per module)	15%

Participation	several per week, completed in class	5%
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- Grade disputes must be initiated within one week from when the assignment was handed back
- Class attendance will not be graded, but will be monitored by turning in your group practice problems.
- For late assignments, 10% will be deducted per day that the assignment is late.

Exams:

- Make up exams are **NOT** administered except under exceptional circumstances (such as significant medical or family issues), no other excuses (vacations, weddings, travel, etc) will be accepted. You must get approval for a makeup exam prior to missing the exam.
- Please note the exam dates for this course. If you have a legitimate scheduling conflict you must notify me within the first 2 weeks of class. Otherwise, you will have to take exams as scheduled in the syllabus. If you are ill or have another unexpected issue come up, you must have approval for a make up exam before missing it, otherwise you cannot make up the exam.
- Exam format: exams will be taken in class (50 min) and administered online via Canvas. You will be allowed to use your textbook and your notes for exams; however, please note that exams are designed such that only students relying very little, if at all, on their notes will be successful on the exam. Depending on the COVID-19 situation I may choose to go back to paper exams during the semester, but the open book/open note aspect will not change.

Homework Assignments

▶ Homework assignments will be completed in groups, and we will have 1 HW assignment per module (5 total). It is expected that each group member contribute equally to the HW workload. A portion of your grade will be determined by the peer evaluation. An ungraded, mid-semester evaluation will be completed so that you can get feedback from your group, before the final, graded evaluation at the end of the semester.

Presentation

As a group, you will prepare a presentation on the inheritance of a genetic trait, and we will have class presentations during the final exam period. Please see the [presentation assignment](#) for additional details.

Participation

I will intersperse lecture with practice problems and questions, and part of your grade is determined by participation in class discussions. I will randomly call on individuals to answer a question or contribute a thought, and you earn points by participating. You are not penalized for incorrect answers or for asking for help from other students. Please see the [Participation assignment](#) on Canvas for more details on this part of the course, and for a rationale on why I'm using random calling for this course.

Grading Scale:

The following scale will be used to calculate final grades. Student point totals or grading scheme may be adjusted to reflect course difficulty or section differences at the instructor's discretion.

	B+ 87.0-89.9%	C+ 77.0-79.9%		
A 93.0-100%	B 83.0-86.9%	C 73.0-76.9%	D 60.0-69.9%	E <60%
A- 90.0-92.9%	B- 80.0-82.9%	C- 70.0-72.9%		

Standard rounding procedures will apply. For example, an 82.94 would be rounded down to a B-, and an 82.95 would be rounded up to a B.

COVID-19 precautions

For the safety of your fellow students, faculty, and staff, please do not attend class if you feel ill. If you start to feel ill during class, please let me know and feel free to leave if you need to. Lecture slides and corresponding readings are posted online, and I can facilitate helping you get notes from class if needed if you're absent. It is imperative that you communicate with me about your absence from class - you should notify me *before class* that you will be absent, unless it's an emergency. Wearing masks is required in the buildings and classrooms on campus, and it's expected that you wear your mask (correctly, covering both your nose and mouth) at all times. Safety is a top priority and I'm confident that if we communicate and work together we can have a safe and productive semester!

Biology Proficiency Required for Biology & Biochemistry Majors:

Students must achieve a combined C+ average or better in their first two required Biology lecture courses completed at SUNY Geneseo. Required lecture courses are: BIOL 117, BIOL 119, BIOL 203* (*not a required lecture for the Biochemistry program), BIOL 222, BIOL 300. For most freshman students, the

first two required lecture courses would be BIOL 117 and BIOL 119. For freshman students with a 5 on the AP Biology exam, it would be BIOL 203 and BIOL 222, unless they elect to retake BIOL 117 and BIOL 119 here.

This policy will apply to transfer students as well. They may be further along in the required sequence (e.g. they could have credit for BIOL 117, BIOL 119, and BIOL 203), in which case the first two required lecture courses would be BIOL 222 and BIOL 300. If they already have credit for both BIOL 222 and BIOL 300, they would need to achieve a grade of C+ in BIOL 300 in order to remain a Biology/Biochemistry major.

Please note a student may only repeat a required Biology course, or related requirement, once for major credit; the repeated course must be taken at the next offering of the class. It may be advisable for transfer students to take other science courses (e.g. Biology courses not required, but electives, for the major, or chemistry or physics courses) their first semester here in order to get acclimated to SUNY Geneseo's rigor before taking the courses that are evaluated for Biology proficiency.

Students performing poorly as a major may choose to withdraw from a required lecture course before the deadline rather than earn a grade that will make it difficult to achieve a C+ average, but this may make it difficult to graduate in eight semesters.

Tips for Success

- Set up a schedule for keeping up with Genetics lectures and homework assignments. Use assignments as a learning tool (after each assignment, assess your learning and where you can improve before the exam. After each exam, assess what went well and what could go better).
- Don't procrastinate - if you're struggling or don't understand something, get help during office hours as soon as possible. There are resources available if you need help, use them!
- Take advantage of the textbook practice questions. Particularly for problems involving complex crosses and calculations, practice problems are extremely helpful!
- ▶ assigned readings for class – my suggestion is to read over the assigned text before viewing the lecture. This will help familiarize you with the topics that will be covered, and if any topics are completely unfamiliar to you then you can do a more in-depth reading of that section. After lecture, take a more careful look at the assigned readings, using what we covered in lecture to focus your reading.

Accessibility

SUNY Geneseo is dedicated to providing an equitable and inclusive educational experience for all students. The Office of Accessibility will coordinate reasonable accommodations for persons with documented physical, emotional, or cognitive disabilities, as well as medical conditions related to pregnancy or parenting. Students with letters of accommodation should submit a letter to each faculty member at the beginning of the semester and discuss specific arrangements. Please contact the Office of Accessibility Services for questions related to access and accommodations: Erwin Hall 22, (585) 245-5112 access@geneseo.edu, [. \(mailto:access@geneseo.edu\)](mailto:access@geneseo.edu) www.geneseo.edu/accessibility-office [. \(http://www.geneseo.edu/accessibility-office\)](http://www.geneseo.edu/accessibility-office)

Academic Dishonesty & Plagiarism

Students are expected to adhere to the University's policy on academic dishonesty and plagiarism, located in the handbook. Academic dishonesty and plagiarism have serious consequences, and if you're struggling, please ask for help rather than resort to dishonesty! Academic dishonesty will result in a zero on the assignment or exam. In addition, a report will be filed to the department chair and Dean of the College, and a record of academic dishonesty will be placed in the student's file at the Dean of Students Office. I have a strict policy regarding cheating and academic dishonesty; it doesn't matter if the incident involves a group practice problem, a homework assignment, or an exam – cheating is cheating, and will be dealt with accordingly as described above. In addition, it is also considered cheating to share your work with someone else and let them copy it – you will get a zero for the assignment and be reported if you let others copy your work.

Tentative Schedule (subject to change at instructor's discretion)

Date	Subject	Reading
(M) 08/30	Introduction	--
(W) 09/01	<i>Begin Module 1 material</i> DNA as the genetic material	208-211 (Ch 9)
(F) 09/03	Structure of DNA and RNA I	211-224 (Ch 9)
(M) 09/06	LABOR DAY NO CLASS	--
(W) 09/08	Structure of DNA and RNA II	211-224 (Ch 9)
(F) 09/10	DNA organization	229-247 (Ch 10)

(M) 09/13	DNA replication I; HW 1 due	252-272 (Ch 11)
(W) 09/15	DNA replication II	252-272 (Ch 11)
(F) 09/17	EXAM I (module 1 material)	--
(M) 09/20	<i>Begin Module 2 material</i> Polymerase chain reaction (PCR) and DNA sequencing	519-522; 524-526 (Ch 21)
(W) 09/22	Mitosis & Meiosis	46-61 (Ch 3)
(F) 09/24	Chromosome Structure & Number	177-195 (Ch 8)
(M) 09/27	Mendel's Laws of Inheritance	18-38 (Ch 2)
▶ 09/29	Mendel's Laws of Inheritance & Probability	18-38 (Ch 2)
(F) 10/01	Inheritance of sex chromosomes	64-70 (Ch 3); section 5.2 (skip expt 5.6)
(M) 10/04	Complex & Non-Mendelian Genetics; HW 2 due	76-90 (Ch 4); 102-105 (Ch 5)
(W) 10/06	Pleiotropy and Gene Interactions	91-95 (Ch 4)
(F) 10/08	EXAM 2 (module 2 material)	--
(M) 10/11	FALL BREAK - no CLASS	
(W) 10/13	<i>Begin Module 3 material</i> Genetic Linkage & Mapping I	127-141 (Ch 6)
(F) 10/15	Genetic Linkage & Mapping II	127-141 (Ch 6)
(M) 10/18	Disease alleles and humans – detection and mapping	611-620 (Ch 25)
(W) 10/20	Bacterial Genetics	155-165 (Ch 7)
(F) 10/22	Viral Genetics & COVID-19	433-442 (Ch 18; skip expt 18A section)
(M) 10/25	Methods: blotting; HW 3 due	529-531 (Ch 21)
(W) 10/27	Central Dogma	278-281 (section 12.1); 306-309 (section 13.1)
(F) 10/29	EXAM 3 (module 3 material)	--
(M) 11/01	<i>Begin Module 4 material</i> Transcription – making RNA from DNA	281-290 (Ch 12)
(W) 11/03	RNA processing in Eukaryotes	291-300 (Ch 12)

(F) 11/05	Translation	309-330 (Ch 13)
(M) 11/08	Gene regulation in bacteria, intro; draft of presentation due	336-338 (section 14.1)
(W) 11/10	Gene regulation in bacteria, <i>lac</i> operon	339-347 (Ch 14)
(F) 11/12	Gene regulation in eukaryotes, intro	361-368 (Ch 15)
(M) 11/15	Gene regulation in eukaryotes, role of DNA structure; HW 4 due	369-377, 388-390; 400-402 (agouti phenotype + bees)
(W) 11/17	Gene regulation by non-coding RNAs & RNAi	411-422 (Ch 17); section 14.5 (Ch 14)
(F) 11/19	EXAM 4 (module 4 material)	--
(M) 11/22	<i>Begin Module 5 material</i> Mutations	461-478 (Ch 19)
(W) 11/24	Thanksgiving Break - NO CLASS	--
(F) 11/26	Thanksgiving Break - NO CLASS	--
(M) 11/29	DNA Repair	479-485 (Ch 19)
(W) 12/01	CRISPR	read assigned article on Canvas; 423-426 (Ch 17)
(F) 12/03	Human genetics: race and ancestry	TBA
(M) 12/06	Genetics in Medicine I - cancer genetics; HW 5 due	624-634 (Ch 25)
(W) 12/08	Genetics in Medicine II - genome sequencing	577-580 (Ch 23); 570-576 is also very relevant to our discussion, but goes into more technical detail than we will FYI
(F) 12/10	Genetics in Medicine III - personalized genomics	TBA
(M) 12/13	Exam 5 (module 5 material)	--
(W) 12/15	Presentations; section 01 (MWF 930-1020) final exam period is 12:00-2:30 pm	--
(T) 12/21	Presentations; section 02 (MWF 1030-1120) final exam period is 3:30-6:00 pm	--