

Course Code & No. – Section (CRN):	BIOL 410-1 (10402) and BIOL 415-1 (10403)
Course Title (Credits):	Genetics (3 credits) and Genetics Lab (1 credit)
Term & Year:	Spring 2020
Instructor:	Suzanne Gollery
Phone(s):	Office: 775-881-7456 Cell (texts are best): 775-813-4215
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Office:	TCES 223
Office Hours:	Mon 4:00-5:00pm, Wed 10:30am-noon, Fri 2-3pm or by appointment
Class Meeting Time:	BIOL 410: TR 5:00-6:45 pm; BIOL 415: R 1:00-4:45 pm
Locations:	TCES 204 (BLAB – Biology Lab)
Prerequisites:	BIOL 101, BIOL 102, & MATH 251 or instructor approval
Corequisites:	BIOL 410 and BIOL 415 are corequisites

Required text and materials:

1. Klug, Cummings, Spencer, Palladino, and Killian, *Modified Mastering Genetics with Pearson eText – Instant Access – for Concepts of Genetics, 12th Edition*, Pearson, 2019. You will get this directly through our BIOL 410 Canvas course MyLab and Mastering link. You can pay with a pre-purchased access code or credit card. If you absolutely want a paper text, purchase any edition. Be aware that chapter order is different in the Global Edition, so use chapter titles to find the correct reading assignment.
2. BIOL 410 Canvas Course (For simplicity, both BIOL 410 and BIOL 415 materials and assignments will be administered through the BIOL 410 Canvas Course.)
3. Bound or spiral notebook (not looseleaf) to use as a laboratory notebook.
4. Laptop or Tablet that meets SNC requirements. You should have Adobe Reader installed for pdf files.

Course Grades and Grading Scale: Genetics and Lab are corequisite courses and the material from each is integral to the other, so you will earn the same grade for both courses. Lab work is worth 25% of your Genetics and Lab grade (1 credit) and other classwork is worth 75% of your Genetics and Lab grade (3 credits).

Grading scale:

92% to 100%	A
90% - 92%	A-
88% - 90%	B+
82% - 88%	B
80% - 82%	B-
77% - 80%	C+
67% - 77%	C
65% - 67%	C-
63% - 65%	D+
53% - 63%	D
50% - 53%	D-
Below 50%	F

Assignments and Percent of grade (weighting):

Lab assignments	25%
DSMs (Dynamic Study Modules)	20%
Chapter homework	10%
Genetics Debate	5%
Exams (4)	40%

Brief assignment descriptions: (More complete instructions are provided on Canvas and in class.)

Lab assignments: (25% of grade) Lab assignments include keeping a laboratory notebook, attending lab class regularly and doing an equitable share of the work, and writing one primary research article-style lab report. The purpose of lab assignments is to help you experience what science genetics research is like and practice communicating about it in primary research article format. Completing lab assignments is the ultimate in active learning for science majors.

Dynamic Study Modules (DSMs): (20% of grade) Genetics students will complete DSMs through Mastering Genetics as a class preparation assignment, to learn key facts and concepts about course topics prior to attending class. The purpose of DSMs is to encourage students to learn concepts presented in an interactive format so that you know what is confusing for you and can focus class time on these topics. Practicing material periodically also helps you learn and remember it better. You earn full credit for completing DSMs by the due date, but no credit after the due date. This policy stresses the importance of your responsibility to prepare for class. You may always work through DSMs again or after the due date to learn course content for exams. Please use the MyLab and Mastering link in the Navigation menu on the left side of our Canvas course to access DSMs, as this ensures that your scores automatically sync with the Canvas gradebook. If you don't see DSM scores in the Canvas gradebook, let me know, because I can sync or enter them manually.

Chapter homework through Mastering Genetics): (10% of grade) Students will complete an online chapter homework assignment through Mastering Genetics shortly after we have completed that chapter in class. Assignments are accessed through the BIOL 410 Canvas Course. Chapter HW questions are scored for accuracy, but you may make multiple attempts to answer questions without significant loss of credit. The purpose of Chapter HW is to give students another chance to practice chapter facts and concepts prior to studying for exams. Science shows us that people learn more when they practice (review) what they are learning several times and sleep between practice sessions. Students who complete a Chapter HW assignment after the due date will lose 10% of the points possible per day, but no more than half credit (you earn half credit for even very late Ch HW). Your Ch HW scores should sync automatically with Canvas. Please let me know if they aren't, because I can retrieve your Mastering Genetics scores directly.

Genetics Debate (fun!!): (5% of grade) Students will work as small teams to debate ethical issues involving genetics technology. Teams will research the pro or con position of an ethical issue and prepare argument that logically support their position. They will have time to rebut the opposing position. Teams will submit debate notes with citations. One team will WIN each debate and earn 5 point more than the losing team. We will have outside judges to help determine the winning teams. The purpose of the genetics debate is for students to practice researching a topic, critical thinking, and oral presentation skills, which are essential for professional success in any discipline.

Exams: (40% of grade) Students will take four in-class written exams, each covering about one quarter of course content. Exams are scored for content accuracy. The purpose of exams is to assess how well students can recall and understand Genetics facts and concepts. If anxiety makes it hard for you succeed on exams, keep in mind that 60% of your course grade depends on completing assignments that are NOT exams, so that it is possible to pass Genetics and Lab with a C grade by averaging 30% on exams. Of course, this assumes that you do other course assignments on time and well. Make-up exam policy: I will give one comprehensive make-up exam at the end of the semester. Students may replace a missed exam or lower exam score with the make-up exam score. Athletes who must miss an exam for competition or sports travel can take the regular exam proctored by their coach (or by me for home competitions).

Course Descriptions

BIOL 410: Genetics (3) [AY] Prerequisites: BIOL 101, BIOL 102, and MATH 251. Corequisite: BIOL 415.

Introduction to the transmission and expression of genetic material as it occurs in nucleate organisms from yeast to man. The genetic biology of eukaryotes is considered on the molecular, cellular, developmental, familial and population levels, with emphasis on inferences drawn from experiments and observations.

BIOL 415: Genetics Lab (1) [AY] Corequisite: BIOL 410. Introduction to modern molecular genetics techniques, including recombinant DNA technology, restriction mapping, Southern blotting, PCR, DNA sequencing, and bioinformatics.

Class policies:

1. **No food or drinks in TCES 204:** It is against Federal and State law for people to eat and drink (including water) in TCES 204. This is to protect us all from chemical and biological hazards used in the room. Please hydrate before and after class. You are welcome to step out of the room to hydrate during lab activities. You may store food and drinks INSIDE your backpack or on the table just outside the TCES 204 door.
2. **Laboratory safety:** You will get lab safety training at the start of the semester. It is important to cooperate with lab safety procedures and **pay attention when the I am giving lab activity instructions.** Everyone is **REQUIRED BY LAW to wear long pants, closed shoes (heels and toes covered, hard soles), and pull back long hair during lab activities.**
3. **Attendance:** Success in Genetics and Lab is significantly influenced by participation in class and lab activities. You cheat yourself if you skip class without a really good reason! Please email me to explain why you have missed class. Because we are working with living organisms, it is impossible to completely schedule lab work within the 4-hour lab class period. Students will need to coordinate and share lab work done outside of class, especially when collecting virgin female fruit flies to set up crosses. The **purpose** of requiring outside-of-class lab work is to help students experience a professional science work schedule.
4. Consistent with a growth mindset, **do your own work and write answers in your own words.** It is cheating to copy from sources (including cutting and pasting from the Internet) or other students. You must really understand a concept to write about it in your own words, so this is an important step in learning. Transcribing the correct answer won't help you learn and remember it!
5. **Turning in work:**
 - a. **Written work and presentation materials should be uploaded as pdf files to the BIOL 410 Canvas course.** Saving documents and slides as a pdf file will preserve your formatting and figures, whereas figures may "disappear" when you convert Google docs or pages files to docx (Word). I will periodically ask to review lab notebooks during lab class.
 - b. If you have difficulty uploading work to Canvas, **you can email work to me to meet due dates and times.** If you email work, please follow up if I haven't replied that I got your work after a couple of days. I much prefer that you upload work to Canvas if possible.
 - c. You may turn in late work until midnight on Friday, April 24, one week after our last class. Late work is worth half credit (50%), except for DSMs. I MAY excuse your lateness and give you full credit if I agree that you have a good reason for turning in work late, so please talk to me!
6. **Make-up exams:** I will not give make-up exams before or after every exam. Instead, **students who miss exams for any reason can take a comprehensive make-up exam at the end of the semester.** Students who did less well than usual on an exam may also take the make-up exam to replace a lower exam score. Athletes who must miss an exam for competition or sports travel can take the regular exam proctored by their coach (or by me for home competitions).
7. **SNC athletes** will miss some classes, labs, and even exams. **Athletes are excused from being in class, but are NOT excused from making up work missed due to competitions or sports travel.** Please let me know as early as possible when you will miss class. Schedule work for missed classes (DSMs, chapter HW, make-up labs) so that you have the work completed by the due dates and before we have the exam over that material. This may mean doing work before you travel or while you travel. Don't count on having internet while you travel – make sure you have downloaded and/or printed assignments and the text. Contact me if you cannot turn in work on time, so that I can work with you on due dates.

8. Course communication:

- a. This course syllabus is intended to provide you with a clear and accurate outline of course content, student outcomes, class policies, class topics, assignment due dates, and exam dates. You should keep and refer to the syllabus regularly, and learn how to access it on the Canvas course website. I reserve the right to make announced changes to the syllabus and class schedule at my discretion if it is in the best interest of my students to do so.
 - b. I will make some important course announcements through Canvas and SNC email. You should check your SNC email regularly. You can forward your SNC email to some messaging service that you actually use and there are instructions on the IT Help page of the SNC website.
 - c. Although I have a rough outline of the course schedule on Canvas, I will regularly update with handouts and material used in class. You can find out a lot about what happened in class by going to Canvas afterward (but it's not a good substitute for attending class). Refresh your browser if you don't see something on Canvas that I say is there. Please contact me if you still can't find it.
 - d. I will post all course assignment and exam scores on Canvas. I do my best to score assignments and post scores within a week of the assignment due date.
 - e. Please reach out to me by email, Canvas comment, by phone, or coming to office hours if you want to discuss something with me. FYI, my cell phone doesn't have good coverage in my office, so if your call is dropped, try the office phone number. I do pay attention to texts and emails. I teach from 11:00 am to 7 pm on Tues and Thurs this semester, so I probably won't give you a rapid response on those days!
9. **Office hours** are for you to get individual help from me outside of class. Easy access to your professor is part of why many of you chose SNC. Please use this resource for individualized instruction, advising, or just to visit! I promise to be in my office Mondays 4:00-5:00 pm, Wednesdays 10:30 am-noon, and Fridays 2-3 pm. If these times don't work for you, please text or email to ask for an appointment.

Student Outcomes for BIOL 410/415: Upon completion of Genetics and Lab, students will

1. demonstrate sufficient understanding and recall of the transmission and expression of genetic material of eukaryotes to be successful in graduate level biology and health science courses.
2. demonstrate ability to answer questions about eukaryotic genetics like those on standardized exams (such as the GRE, MCAT, or senior exit exams).
3. demonstrate skill at critical analysis, logic, and problem solving relating to the transmission and expression of eukaryotic genetic material.
4. communicate about and critique issues surrounding application of molecular genetic technology to solve societal problems.
5. demonstrate competence in basic molecular genetics techniques.
6. demonstrate competence in presenting and analyzing scientific data in poster and paper format used by scientists.

Methods of Assessing Student Outcomes: Student outcomes will be assessed using the following:

1. Online Dynamic Study Module (DSM) assignments coordinated with assigned reading
2. Online Mastering Genetics Chapter Homework assignments to help you review content outside of class
3. Laboratory assignments (keeping a lab notebook, sharing collaborative lab work, writing a research paper)
4. Written in-class, closed-book exams
5. Formal debates about controversial genetic technologies
6. Instructor observations of students in class

Instructional Strategies: BIOL 410 is a content-heavy science course, which means that you will learn facts and concepts and a large amount of discipline-specific vocabulary related to genetics. The field of genetics has exploded with new information in the last decade. Thus, I will ask you to learn much of the easier content outside of class by reading the text, completing DSMs, and doing chapter HW. You will get a lot out of this class if you do your own work on assignments and try to really understand the material, rather than going through the motions to get assignments done.

ADA Accommodations: In accordance with the Americans with Disabilities Act and Section 504 of the Rehabilitation Act of 1973, students with a documented disability are eligible for support services and accommodations. If a student wishes to request an accommodation, please contact the Director of Academic Support Services, Henry Conover, at (775) 831-1314 x7534, hconover@sierranevada.edu, office in Prim Library: PL-304.

Sanctions for Cheating and/or Plagiarism

The Honor Code

The faculty of SNC believes students must be held to high standards of integrity in all aspects of college life in order to promote the educational mission of the College and to encourage respect for the rights of others. Each student brings to the SNC community unique skills, talents, values and experiences which, when expressed within the community, contribute to the quality of the educational environment and the growth and development of the individual. Students share with members of the faculty, administration and staff the responsibility for creating and maintaining an environment conducive to learning and personal development, where actions are guided by mutual respect, integrity, responsibility and trust. The faculty and students alike must make diligent efforts to ensure high standards are upheld by their colleagues and peers as well as themselves. Therefore, faculty and students accept responsibility for maintaining these standards at Sierra Nevada College and are obligated to comply with its regulations and procedures, which they are expected to read and understand.

Consequences of Violating the Student Honor Code

SNC students and faculty share the responsibility for maintaining an environment of academic honesty. Thus, all are responsible for knowing and abiding by the SNC Faculty/Student Honor Code published in the current SNC Catalog. Faculty are responsible for presenting the Honor Code and the consequences of violating it to students at the start of their classes AND for reporting all incidences of academic dishonesty to the Provost. Students are responsible for knowing what constitutes CHEATING, PLAGIARISM and FABRICATION and for refraining from these and other forms of academic dishonesty. Violations of the Honor Code become part of a student's academic record.

1st Offense: Student receives a zero for assignment/exam and counseling with faculty on the honor code, consequences for violating the honor code, and the value of academic honesty in learning.

2nd Offense: Student fails course and receives counseling with faculty on the honor code, consequences for violating the honor code, and the value of academic honesty in learning.

3rd Offense: Student is expelled.

Cutting and pasting or copying phrases or sentences from internet sources, books, articles, or other students is a violation of the student honor code. If you consistently write using your own words, you will avoid plagiarizing or cheating.

Prim Library Resources: Using the library's resources effectively (not just internet resources) contributes to developing each of SNC's core themes by exposing students to high quality academic resources, diverse opinions, new ideas, and a future that includes building on a liberal arts education. In this course, you will be expected to utilize the library's resources (either on-site or remotely) as you complete your assignments.

Prim Library Resources for Geentics and Lab include, but are not limited to:

1. Electronic databases (for peer-reviewed primary source research articles, secondary source reviews, newspaper magazine articles, and online books): Electronic databases most likely to include articles on biology topics are EBSCO: Academic Search Premier, Environment Complete, General Science Collection, GreenFILE, Health Source, Newspaper Source, and TOPICsearch; BioOne; and GREENR.
2. Books (can be checked out): In general, books related to biology have Library of Congress Classification numbers ranging from QH through RC. Books about biotechnology have LCC numbers beginning with TP. However, you will find books related to our course with other LCC numbers, so search the Prim Library Catalog using key words related to the topic that you are researching.
3. Hardcopy periodicals: Prim Library has current subscriptions for Science, New Scientist, Science News, Scientific American, and National Geographic Magazine. Any of these are likely to have secondary source articles about biology topics written for educated people who are not necessarily scientists. You will find these easy to read and articles will include references to primary source articles. Full-text articles from many more periodicals are available through the electronic databases.
4. Lib Guides: <http://Libguides.sierranevada.edu> These web pages contain instructions about how to use resources available at Prim Library, how to evaluation the appropriateness of information from the internet, how to cite sources, and other topics related to finding and using information.

The SNC Email System

The SNC email system is the official communication vehicle among students, faculty members and administrative staff and is designed to protect the confidentiality of student information as required by the Family Educational Rights and Privacy Act of 1974 Act (FERPA). Students should check their college email accounts daily during the school year.

Students have a right to forward their SNC e-mail to another e-mail account (for example, @hotmail or @gmail). However, confidentiality of student information protected by FERPA cannot be guaranteed for SNC e-mail forwarded to an outside vendor. Having email redirected does not absolve a student from the responsibilities associated with official communication sent to his or her SNC email account.

The Sierra Nevada College Mission Statement:

Sierra Nevada College graduates will be educated to be scholars of and contributors to a sustainable world. Sierra Nevada College combines the liberal arts and professional preparedness through an interdisciplinary curriculum that emphasizes entrepreneurial thinking and environmental, social, economic and educational sustainability.

The Core Themes: Four core themes from the SNC mission are woven through all courses and the life of the community at SNC.

Liberal Arts Professional Preparedness Entrepreneurial Thinking Sustainability

Genetics and Lab Schedule of classes, reading assignments, and due dates:

Week	Date	Day	¹ Reading assignment	Class topics	² Work due
1	Jan 20	M		Martin Luther King Jr. Holiday	
	Jan 21	T	Syllabus	Real World Genetics	
	Jan 22	Lab	Bring notebook	Genetics Lab Skills Orientation	
		R	Chapter 1	Overview of Genetics	Intro to DSMs (class start)
2	Jan 27	M			Ch 1 HW due 11:59 PM
	Jan 28	T	Ch 2; Ch 3 thru 3.7	Cell Division/Mendelian Inheritance	DSM Ch 2 start of class
	Jan 30	Lab	See Canvas	Start Drosophila and Fast Plant cultures	
		R	Ch 3: 3.8 to end	Chi square test with Excel (bring laptops)	DSM Ch 3 start of class
	Jan 31	F			Ch 2 HW 11:59 PM
3	Feb 3	M			Ch 3 HW
	Feb 4	T	Chapter 4	Inheritance Complexity	DSM Ch 4
	Feb 6	Lab		Inheritance problem practice	
		R	Chapter 5	Chromosome Mapping	DSM Ch 5
	Feb 7	F			Ch 4 HW
4	Feb 10	M			Ch 5 HW
	Feb 11	T	READ Chapter 25	Quantitative Inheritance	(no Ch 25 DSM)
	Feb 13	Lab		Cat coat color activity	
		R		Exam 1: Inheritance – Chapters 1 – 5 and 25	Ch 25 HW (due 1 PM)
5	Feb 18	T	Chapters 7 and 8	Sex development, sex chromosomes, and chromosomal mutations	DSMs 7 and 8
	Feb 20	Lab		Score F ₁ fly generation and F ₂ crosses	
		R	READ Chapter 9	Extranuclear inheritance	
	Feb 21	F			Ch 7 HW
6	Feb 24	M			Chs 8 and 9 HW
	Feb 25	T	Chapters 10 and 11	DNA structure, replication, & recombination	DSMs 10 and 11
	Feb 27	Lab			
		R	Chapter 12	DNA organization in chromosomes	DSM 12
	Feb 28	F			Ch 10 HW
7 (mid-terms)	Mar 2	M			Chs 11 and 12 HW
	Mar 3	T		Exam 2: Chromosomes – Chapters 7 – 12	
	Mar 5	Lab			
		R	Chapter 13	Genetic code and transcription	DSM 13
	Mar 6	F	(you know you'd rather get Ch 13 HW out of the way before break!!)		Ch 13 HW
Spring Break – Saturday, Mar 7 through Sunday, Mar 15: rest, play hard, and return ready to rock school again					

¹ Read BEFORE CLASS for the BEST learning opportunity. Read BEFORE THE EXAM to do well in the class.² DSMs are DUE at the beginning of class and Ch HW assignments are DUE at 11:59 PM on the due dates.

Week	Date	Day	Reading assignment	Class topic	Work Due
8	Mar 17	T	Chapters 14 and 15	Translation, mutation, DNA repair, and transposition	DSMs 14 and 15
	Mar 19	Lab	Debate instructions		
		R	Chapter 17	Transcriptional regulation of gene expression	DSM 17
	Mar 20	F			Ch 14 HW
9	Advising for Fall 2020 Semester This Week – Science Seniors to Bozeman MT				
	Mar 23	M			Chs 15 and 17 HW
	Mar 24	T	Chapter 18	Post-transcriptional regulation of gene express	DSM 18
	Mar 26	Lab			
		R	READ Ch 19	Epigenetic regulation of gene expression	
	Mar 27	F			Ch 18 HW
10	Advising for Fall 2020 Semester This Week				
	Mar 30	M			Ch 19 HW
	Mar 31	T		Exam 3: Gene expression – Chs 13–15, 17–19	
	Apr 2	Lab			
		R	READ Ch 20 and Special Topics 1	Recombinant DNA technology, CRISPR	
	Apr 3	F	Graduation Petitions are Due to the Registrar (with advisor and department chair signatures)		
11	Apr 6	M			Ch 20 HW
	Apr 7	T	Ch 21 & READ ST3	Genomic analysis, Precision medicine	DSM 21
	Apr 9	Lab		Tie up last of lab experiments	
		R	READ Ch 22 & ST 4 and 5	Applications of genetic technology, GM Foods, Gene therapy,	
	Apr 10	F			Ch 21 HW
12	Apr 13	M			Ch 22 HW
	Apr 14	T	Chapter 24	Cancer genetics	DSM 24
	Apr 15	Lab		Genetics Debates	Debate notes w/ sources
		R		Exam 4: Applied genetics Chs 20-23, ST 1,3,4	
13	SNC Senior Symposium Week – Attend these events for extra credit and because they're awesome!				
	TBA			BIOL 410 Comprehensive Make-up Exam	
	Apr 20	M	2 – 4 PM 6 – 9 PM	Psychology Research Fair Business Plan Competition	TCES 139/141
	Apr 21	T	1:30 – 4:30 PM 5:30 – 8:30 PM	Humanities & INTD Senior Projects SBRM Master Plan Competition	TCES 139/141
	Apr 22	W	4 – 7 PM	Science Student Symposium	TCES 139/141
	Apr 23	Th	5 – 7 PM	BFA Gallery Reception Trashion Show, Art Prom	Prim Library 320 Holman Garage Gallery
	Apr 24	F	4 – 6 PM 7 PM on	SNC Student Symposium Poetry Slam!	TCES 139/141 Patterson Cafeteria Lab research paper due