

<b>Course Code &amp; No. - Section:</b>	BIOL 410/415 - Section 1
<b>Course Title (Credits):</b>	Genetics (3) and Lab (1)
<b>Term &amp; Year:</b>	Fall / 2015
<b>Course Ref. No. (CRN):</b>	80096 (410) and 80097 (415)
<b>Instructor:</b>	Dr. Suzanne Gollery
<b>Phone(s):</b>	775-831-1314 ext7456 or 775-813-4215 (7 a.m. – 9 p.m.)
<b>Email:</b>	<a href="mailto:sgollery@sierranevada.edu">sgollery@sierranevada.edu</a>
<b>Office:</b>	TCES, room 223
<b>Office Hours:</b>	M 3:00-4:00 p.m., R, 4:00-5:00 p.m., F 11:00 a.m.-Noon or by appointment
<b>Class Meeting Time:</b>	MW 11:30 a.m. – 12:45 p.m. and (Lab) Thurs 1:00 – 3:45 p.m.
<b>Location:</b>	TCES 204
<b>Prerequisites:</b>	BIOL 101, 102 and MATH 251
<b>Corequisites:</b>	BIOL 410 and BIOL 415 are co-requisites

**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.

**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 skill at reading and comprehending articles from scientific journals.
3. demonstrate ability to answer questions about eukaryotic genetics like those on standardized exams (such as the GRE, MCAT, or senior exit exams).
4. demonstrate skill at critical analysis, logic, and problem solving relating to the transmission and expression of eukaryotic genetic material.
5. communicate about and critique issues surrounding application of molecular genetic technology to solve societal problems.
6. demonstrate competence in basic molecular genetics techniques.
7. 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. Class preparation assignments about assigned reading prepared before that material is covered in class
2. Assignments begun in class that may be finished after class (latter is called “homework” on the schedule)
3. Electronic laboratory notebook
4. Research poster and research paper on a lab project
5. Participation in a debate on an ethical issue related to genetics
6. Written in-class, closed-book exams
7. Written in-class, closed-book, comprehensive final examination

### Instructional Strategies

Students will prepare for class by reading assigned materials (text and articles from scientific journals) and either outlining the reading or answering questions from the text. Class preparation assignments (CPAs) are due in hard copy or e-mailed on or before the start of class. CPAs submitted in hard copy or e-mailed after 11:35 a.m. on class days will NOT receive credit. Class time will be spent on 1) clarifying murkiest points and answering questions submitted by students prior to class, 2) working through CPA questions that students found challenging, 3) small group and individual activities in class, some using laptop computers, 4) class discussions, 5) laboratory experiments in which students cross organisms and assess inheritance patterns or practice molecular genetic techniques, and 6) peer critiques of posters and research papers presenting lab data. The course makes use of the *Moodle* course management system.

### Required Texts and Materials

1. Sanders MF, Bowman JL. Genetic analysis: an integrated approach, 2<sup>nd</sup> ed. Boston (MA): Pearson; 2015. Any format is fine (new, used, looseleaf, rented, eBook, European). Mastering Genetics access is NOT required.
2. An electronic lab notebook. Students should bring their laptops or tablets to lab on Thursday, Aug 20 and we will register for electronic lab notebooks. Also bring a credit or debit card or PayPal account information to purchase the ELN. The cost will be \$15. You can access your LabArchives ELN account through any device that connects to the internet via a free app for iOS or Android operating systems.
3. A loose-leaf binder in which to keep all handouts, articles, and returned work during the course.
4. Laptop computer (one that meets the published SNC [Laptop requirements](#) at the link on the IT helpdesk page) and internet access.

### Course policies:

#### 1) Attendance

Success in Genetics and Lab is significantly influenced by participation in class and lab activities. Thus, class and laboratory assignments will be accepted only from students who have performed the activities. Since life happens, students may seek to excuse an absence and have an opportunity to do make up work for excused absences. Absences will be excused for documented illness (of the student or a dependent), military duty, a family bereavement, or at the instructor’s discretion. **Excused absences will NOT be granted for work hours conflicting with class times, oversleeping, providing transportation to another person, or attending optional extracurricular SNC activities, such as Mammoth opening day.**

#### 2) Electronic devices:

Students are not permitted to use MP3 players in class at any time, **including during exams**. Cell phones, tablets, and laptops may be used to access online resources or take notes in class. Students have permission to tape classes for later study. Students will be asked to stow phones, tablets, and laptops if used for non-class-related activities.

**3) Food and drinks:**

Food and beverages, even drinking water, are FORBIDDEN by state and federal safety regulations in TCES 204, the biology lab. Students must leave food and beverages outside of the lab room. Students are free to exit the classroom to get a drink while individuals or teams are working independently, such as during lab activities.

**4) Late work:**

Late CPAs, one-minute essays, and extra credit will not be accepted. CPAs are due at the beginning of the class period on the due date. Other assignments may be turned in late, but students will lose 10% of the possible points for each **calendar day** that work is late. For example, students may earn 20% fewer points for homework due on Monday if it is turned in on Wednesday. Work that is more than seven days late will not be accepted.

**5) E-mailed work:**

All work may be submitted by e-mail or in hard copy. Students may e-mail files generated on a computer or hardcopy work scanned to pdf files. Please include your name in the file name, as 14 students could send a file named "CPA 1". The instructor will reply to verify that e-mailed work was received. It is the student's responsibility to follow up if the instructor does not reply about e-mailed work.

**6) Citing sources:**

Cite sources using the CSE *citation-sequence* (number) system. This web site has information about citing sources using CSE (Council of Science Educators) style, which is similar to that used by most scientific journals: [https://writing.wisc.edu/Handbook/DocCSE\\_CitationSystems.html](https://writing.wisc.edu/Handbook/DocCSE_CitationSystems.html). Scientists routinely cite original sources for factual information that is not widely known. For example, one would not have to cite a source when one states that mutations introduce new genetic variability into the human genome, but one would cite a source when stating that mutations accumulate in human DNA at an average rate of 175 mutations per diploid genome per generation<sup>1</sup>. Get in the habit of citing facts when you find them in a source whenever you write for BIOL 410 or BIOL 415.

1. Nachman M W, Crowell S L. Estimate of the mutation rate per nucleotide in humans. *Genetics* 2000; 156: 297-304

**7) Extra credit:**

Suzanne will offer extra credit for additional work with instructional value regularly throughout the semester. A list of extra credit options will be posted on Moodle. All extra credit is due by class time on Monday, November 30, the Monday following Thanksgiving break. Some extra credit options will have shorter-range due dates, for example, extra credit chapter problems are due with the homework assignment containing that chapter. A student may earn up to 60 extra credit points, 5% of the total number of points possible for the class. Students who have read this syllabus may e-mail Suzanne prior to 11:30 a.m. on Wednesday, August 19, and describe why it is important to come to genetics lab prepared and the penalty for not being prepared, in order to receive 3 points extra credit as a reward for reading the syllabus.

**8) Modifications to the BIOL 410/415 course syllabus:**

This syllabus and schedule is intended to provide students with a clear and accurate outline of course content, student outcomes, class topics, assignments and due dates, and exam dates. Students should keep and refer to the syllabus regularly, and learn how to access it on the course Moodle page. Suzanne reserves the right to make announced changes to the syllabus and class schedule at her discretion if it is in the best interest of the students to do so. Major changes, such as changes to exam dates or coverage and permanent changes to the schedule, will be posted on the Moodle site and students will be e-mailed about such postings.

**Grading Policy**

Since BIOL 410 and 415 are corequisites, and the material of each is so integral to the other, assignments from each will contribute to an overall point total and the same letter grade will be awarded to both courses. The grading curve is based on a 1200-point scale, with 75% of points from BIOL 410 and 25% from BIOL 415. Sierra Nevada College awards half grades (e.g., A- or B+), so a student with a point total within 1.5% of the cutoff for the letter grade will earn the appropriate half grade.

**Grading Curve**

A	90 – 100%	1080 – 1200 points
B	80 – 89.9 %	960 – 1079 points
C	68 – 79.9%	816 – 959 points
D	58 – 67.9%	696 – 815 points
F	<58%	<696 points

Students may earn points in the following ways:

**BIOL 410 (75%):**

CPAs – 18 best at 15 points each	270 points
Homework – 5 best at 15 points each	75 points
Debate	100 points
Exams – 4 at 60 points each	240 points
Comprehensive Final Exam	200 points

**BIOL 415 (25%):**

Lab notebook checks – 12 best at 10 pts	120 points
Lab participation – 12 best - 10 pts each	120 points
Research report	40 points
Poster	<u>35 points</u>

**Total** 1200 points

**Tips for Success in Genetics and Lab**

You will learn the most from this class (and no doubt, earn a better grade) if you are an active participant. That means doing the assigned reading and keeping notes on what you don't understand well so that you can research it later and ask questions for clarification. Do your best to outline the reading in detail or answer CPA questions after reading the assigned chapter and/or articles. Then search the internet, use Wikipedia, consult your study group, send an e-mail to Suzanne with questions, or go to office hours for help with questions you still can't answer. But, don't search the internet or use Wikipedia to answer questions **instead** of doing the assigned reading, as the CPA questions don't query all of the content you should get from the reading assignments. If you purchase a solutions manual, only consult the answers to check your work **after writing answers in your own words**. When you come to class prepared with questions about reading topics that you find confusing, you will be able to direct the class discussion to give you the most help. If you take the easy way out by paraphrasing answers from the solutions manual or Answers.com, then you will not understand the material well enough to pass the exams **and you will be cheating yourself out of learning genetics**.

When you work with other students in class (or outside of class), do your best to think of answers and contribute. Don't wait passively for others to find the answers. You're unlikely to remember material that you experienced passively, but you are likely to remember material that you figured out and explained to others. When working in teams, leaders tend to learn the most, then contributors, participants, and observers. Teams don't like to work with detractors, so you will lose your peer help if you detract.

*Leader –*

does all that is asked  
plus extra  
plus helps someone else

*Contributor –*

does all that is asked  
plus extra

*Participant –*

does all that is asked  
nothing more

*Observer –*

does something,  
but less than is asked

*Detractor –*

does less than is asked  
keeps someone else from doing what they are supposed to do

**Assignment details:**

**Class preparation assignment:** Students will outline the reading assignments OR answer several questions while reading assigned material prior to its being discussed in class.

**Learning goals for the assignment:** Scientific studies on how people learn have shown repeatedly that we learn and remember more when we are active learners. This means that students will remember and be able to apply more facts and concepts of genetics for a much longer time if they learn them by reading and writing about them, communicate about them with other people, and apply them to solve problems in different contexts, than if the same students come to class and passively listen to an instructor lecture about the facts and concepts while taking notes. The class preparation assignments give genetics students a chance to learn actively by reading and answering questions related to the reading. Students are encouraged to write questions asking for clarification of confusing material from the reading assignment and submit them to the instructor by 7 a.m. on class days. Class activities will provide time to address student questions and murkiest points (see one-minute essays, below), work in pairs or small groups to communicate about course content, and apply challenging and important concepts and facts to new situations. Students will gain much more from class activities if they come to class prepared, already having read the text, attempted to answer the questions, and figured out what they understand and what they find confusing.

**How to do the assignment:** Class preparation assignment questions are taken from the end of assigned text chapters. A list of assigned questions can be downloaded from the BIOL 410/415 Moodle site as an MS Word or pdf file (Mac users may have better success with pdf files, because table formatting will be maintained). Answers may be handwritten or typed and either turned in in hard copy or emailed. Students who turn in hard copies should have a second copy (file or hard copy) on which to take additional notes during class and study sessions with team members. Students should expect to spend up to 6 hours outside of class on reading assignments CPAs, and homework, twice the time spent in class. Due dates are given on the schedule and CPA question list.

**Collaboration and individual work:** Students are **encouraged** to work with classmates, because humans are a social species and we learn better that way. **However, each student must write answers to questions in his/her own words.** Students with CPA prose that is identical to or paraphrased from other students work, the text, the solutions manual, Wikipedia, or other published or internet sources **will be reported for violating the academic honesty policy.** Cheaters never learn!

**Scoring and feedback from the assignment:** CPAs will be scored for completeness and effort, that is, students will receive full credit for making a good attempt to answer all questions, regardless of whether or not they are ideal answers. Suzanne reserves the right to judge that answers or an outline show little effort and deduct partial credit, even if all questions are answered. Suzanne will give students written feedback on some answers, but not all. Students should keep their evolving CPA answers in a course binder or file.

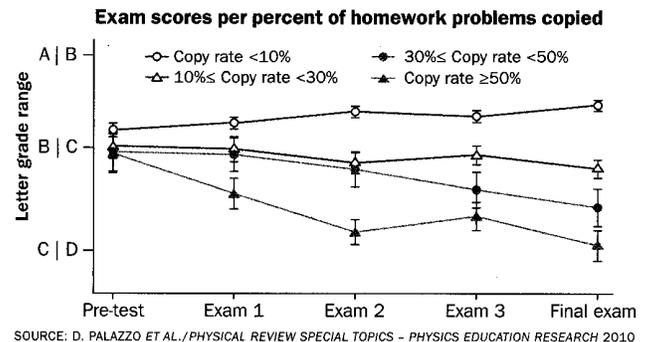
**Student questions:**

While completing assigned reading, CPAs, or other assignments, students are encouraged to write questions for clarification of confusing or difficult concepts or facts and e-mail these questions to the instructor by 7 a.m. on the day of class. Please use a subject heading for your e-mail that states it is a question for class. Questions may be submitted prior to any class, not just classes with CPA or other assignment due dates. Questions and murkiest points will be addressed in class. Your questions will also help direct the class discussion to help you understand what you find most difficult.

**Students will earn 1 point extra credit for meaningful questions for a given week, up to 2 points extra credit per week.**

**Science Stats | CHEATERS NEVER LEARN**

A study of MIT students found that those who copied others' homework more frequently did worse on exams over the course of a semester.



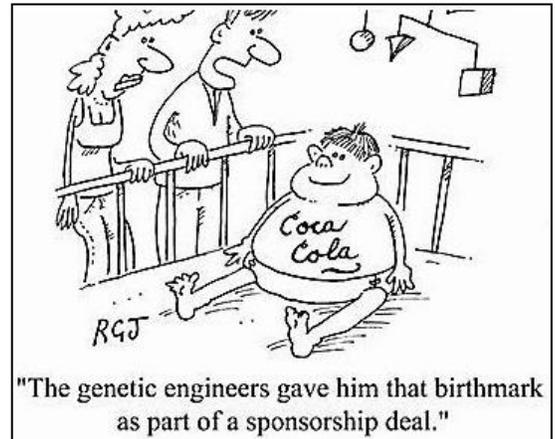
4 | SCIENCE NEWS | May 8, 2010

One-minute essays: In the last couple of minutes of each class, students will have time to write one-minute essays in which they will briefly state, in a complete sentence or two, either:

1. The murkiest point, that is, one concept or bit of content information that they found the least understandable (most confusing) during that class period.
2. Or, if a student understood everything clearly, the most important concept or bit of content information covered in that class period.

The instructor will read the one-minute essays carefully prior to the next class period and structure the class activities to clear up the murkiest points.

Debates: The class will divide into teams to conduct debates on some controversial application of genetic technology to solve societal problems. The class will work together to select debate topics. Each team will research their topic and defend their position in an oral debate. Outside judges and other members of the class will help judge the debates. Some debate points will be awarded based on individual position statements, some based on team fulfillment of assignment criteria, and a 5 points will be awarded to winning debate teams, as judged by the students, instructor, and outside judges.



Exams: Four exams worth 60 points each will cover material learned since the previous exam or start of class, although students are responsible for building on previous course concepts, too. Exams include multiple choice questions, since this format is used on standardized exams, such as the GRE and MCAT. Other questions may include short answer, essay, or true-false formats. Many exam questions will ask students to apply concepts and facts to solve problems or analyze a scenario. Students will have hard copy exams.

Final Exam: A comprehensive final exam with a format similar to the four exams will be given at the end of the semester. The class will decide before Thanksgiving break whether to have the final exam in the period scheduled for BIOL 410 (Tuesday, Dec. 8, 3:00-6:00 p.m.) or in the period scheduled for BIOL 415 (Wednesday, Dec. 9, 3:00-6:00 p.m.).

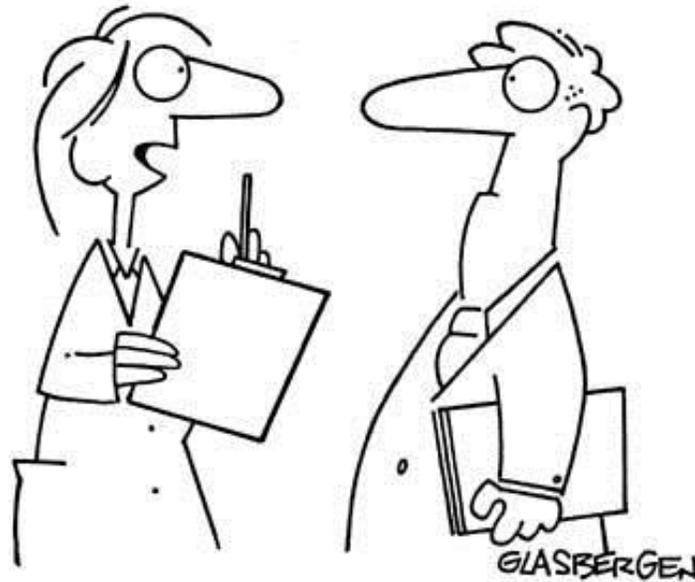
Lab Participation: Using expensive molecular genetics equipment and supplies to do real genetics research is a privilege for SNC students. Coming to class unprepared is the leading cause of careless mistakes that ruin equipment, so the price for failing to prepare is high. Students are expected read lab instructions in their electronic lab notebooks each week and enter answers for pre-lab questions before coming to lab class. **Students who haven't completed pre-lab assignments will lose ALL 10 lab participation points for that day.** Students who prepare for lab and take an active role in lab activities for most of the class period will be awarded 10 lab participation points. The best 12 lab participation scores (of 14) will count toward each student's grade. Most lab activities will be part of multi-week research projects, so students who miss several labs may be unable to complete the research, which will negatively impact their abilities to complete lab research papers and posters, lowering their course grades.

Lab Notebook: Each student will keep a working electronic lab notebook in which they record answers to pre-lab questions, any modifications to procedures in the lab assignments, all photos and descriptions of research data, and questions, thoughts, and conclusions about their experiments. This means that students should bring laptops or tablets to lab class every week. Records should be kept in enough detail that students can use the lab notebook to repeat the experiments or write a detailed lab report about them. Electronic lab notebooks will be checked by the instructor each week to give students feedback on how well they are keeping records and make sure pre-lab work was done. The best 12 notebook scores will count toward the student's grade.

Lab Reports: Each student is responsible for writing one research paper-style lab report about one of the two major lab projects (*Drosophila* or bacterial mutagenesis).

Lab Poster: Students will work individually to construct a research poster based on one of the two major lab projects (*Drosophila* or bacterial mutagenesis). The class will have a poster session at the end of the semester.

Midterm grades: Midterm grades will be calculated using all work due through Monday, October 5, 2015. There will not be a comprehensive midterm exam.



**“The focus group was vehemently opposed to genetically altered corn and wheat, but they loved the chocolate flavored lettuce.”**

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phone: (216) 371-8600 / e-mail: ft@funnytimes.com

### 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 Genetics and Lab include, but are not limited to:

1. Books (can be checked out):
  - a. 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. Prim Library includes a number of general-audience books on controversial topics related to genetics that could be checked out for the course independent reading assignment. (Washoe County Library may have others that can be picked up at the Incline Branch.)
  - b. Pechenik JA. A short guide to writing about biology. 7<sup>th</sup> ed. New York: Longman; 2010. LCC number QH 304. P43 2010
  - c. Lipson C. Cite Right: a Quick Guide to Citation Styles. Chicago: University of Chicago Press; 2006. LCC number PN171. F56L55 2006. Includes a section on CSE style.

2. 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, Annual Reviews, Environment Complete, General Science Collection, GreenFILE, Health Source, Newspaper Source, and TOPICsearch; BioOne; and GREENR.
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, Prim Library resources for biology topics, how to evaluate the appropriateness of information from the internet for a research paper, how to cite sources, and other topics related to finding and using information.

### **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.

- 1<sup>st</sup> 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.
- 2<sup>nd</sup> 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.
- 3<sup>rd</sup> Offense: Student is expelled.

**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](mailto:hconover@sierranevada.edu), office in Prim Library: PL-304.

**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

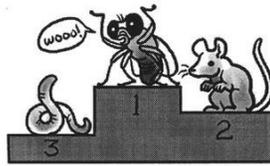
Sustainability



The schedule of classes for Genetics and Lab begins on page 11.

# FRUIT FLIES & SCIENCE

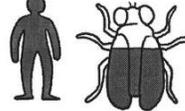
Common fruit flies (*Drosophila melanogaster*) are one of the most frequently used "model organisms" in genetic research.



So what makes them such ideal subjects? Well, they're ...

- Easy to manipulate genetically
- Cheap
- And they have short life spans

What's more, over 60% of fruit fly genes are similar to a human's.



We're really quite similar if you look past our physical differences! They have complex rituals of behavior, they have sleep cycles like us, and they can become addicted to caffeine, cocaine, and other drugs.



How can they be used to study humans?



The entire fly genome was sequenced in 2000. To understand the function of particular genes, scientists can generate a mutation in their genetic code and observe its effects.

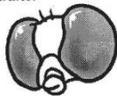


Since flies and humans have the same fundamental genetic system of development, finding answers in their genome may lead to finding similar answers in ours!

There have been some famous mutant flies through history that have helped us understand which genes control specific physical or behavioral traits.

### "White-eyed"

This was the first ever recorded mutant, studied by T.H. Morgan in 1910. The lack of pigment in the eye is a recessive trait.

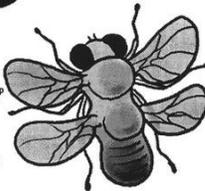


### "Antennapedia"

When scientists mutated a gene that altered the development of legs in flies, their antennae converted into a new, functional pair of legs.



"Bithorax" A mutation in a group of genes that control the differentiation between the thorax and the abdomen makes this change. A segment of the abdomen transforms into a complete second thorax.



What are they currently being used for?

To name a few ...

Scientists are sending some to the international space station to study the effects of gravity on an astronaut's health.



Their resistance to alcohol is being tested to identify strategies in preventing alcohol abuse.

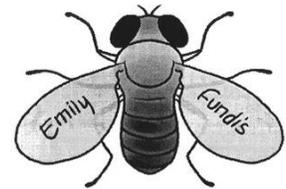


And lab experiments are now revealing secrets about how a particular molecule plays a role in processing memories.



We've only been studying fruit flies in-depth for about a century, and there are still big questions that have yet to be answered.

But all-in-all, something this small has been used to study things as big as cancer, drug abuse, aging, memory loss, developmental disorders, neurological disorders, and even sexual orientation.



2010

Genetics and Lab<sup>1</sup> Schedule - Fall 2015

Week and dates	Class preparation	Class topics	Assignments Due
Week 1 Mon, Aug 17	Bring laptops or tablets to class	Syllabus & knowgenetics.org	
Wed, Aug 19	Read syllabus Read Sanders Ch 1 - CPA 1	Review the molecular basis of heredity and evolution	CPA 1
Thurs, Aug 20 Lab	Bring laptops to class	Genetics lab boot camp	
Week 2 Mon, Aug 24	Read Sanders Ch 7, sections 7.2, 7.3, DNA proofreading (p. 249), Finishing replication (p. 251), and 7.5. Watch HHMI DNA replication video - CPA 2	DNA replication, telomeres, PCR, and DNA sequencing	CPA 2 and HW 1
Wed, Aug 26	Read Sanders Ch 8 - CPA 3	Transcription and post-transcriptional modification of RNA	CPA 3
Thurs, Aug 27 Lab	Read Flies lab assignment and answer prelab questions in ELN	Working with <i>Drosophila</i> : crosses for linkage mapping	Boot camp lab assignment
Week 3 Mon, Aug 31	Read Sanders Ch 9, but skip 9.5 - CPA 4	Translation & post-translational protein processing	CPA 4 and HW 2
Wed, Sep 2	Read Sanders Ch 10 - CPA 5	Sickle cell disease	CPA 5
Thurs, Sep 3 Lab	Read Xmap lab assignment and answer prelab questions in ELN	Restriction mapping of bacteriophage $\lambda$ Plan linkage mapping test crosses - score F <sub>1</sub> offspring?	Flies lab assignment
Week 4 Mon, Sep 7	<i>Study for exam 1 at the beach!!</i>	<i>Labor Day Holiday</i>	
Tues, Sep 8	Exam 1 review session??		
Wed, Sep 9	<b>Study for Exam 1</b>	<b>Exam 1: Chs 1, 7, 8, 9, 10</b>	HW 3 (email by Sun. night for feedback before Exam 1)
Thurs, Sep 10 Lab	Read Sanders Ch 13, sections 13.5 through 13.7 and answer Tn prelab questions in ELN	Transposon mini-lecture Conjugation of Tn <i>E. coli</i> with purple bacterium Score F <sub>1</sub> flies and set up test crosses	Xmap lab assignment

<sup>1</sup> The genetics lab schedule will certainly change, as we will work with living organisms that rarely develop exactly on schedule, so be flexible about when offspring traits are scored and plan to take turns doing it outside of lab class when that's unavoidable.

Week and dates	Class preparation	Class topics	Assignments Due
Week 5 Mon, Sep 14	Read Recovery lab assignment and answer prelab question Read Sanders Ch 2 - CPA 6	Set up recovery plates (lab) Mendelian autosomal inheritance and probability	CPA 6
Wed, Sep 16	Read Sanders Ch 3 - CPA 7	Chromosomal heredity	CPA 7
Thurs, Sep 17 Lab	Read Selection lab assignment and answer prelab questions	Selection of pigment mutants Work on HW 4, Score F <sub>1</sub> flies?	Tn & Recovery lab assignments
Week 6 Mon, Sep 21	Read Sanders Ch 4 - CPA 8	Gene interactions alter Mendelian inheritance patterns (Check pigment mutant plates and streak for pure cultures)	CPA 8 and HW 4
Wed, Sep 23	Read Sanders Ch 5 and Ch 21, section 21.1 - CPA 9	Linked genes and genetic mapping; multigene inheritance	CPA 9
Thurs, Sep 24 Lab	Read DNA lab assignment and answer prelab questions	Extract genomic DNA from pigment mutants Score F <sub>2</sub> flies and set up linkage analysis equations in Excel	Selection lab assignment
<b>Thurs &amp; Fri, Sep 24-25</b>	<b>Junior English Proficiency Exam</b>		
Week 7 Mon, Sep 28		More inheritance problem practice & exam review	HW 5
Wed, Sep 30	<b>Study for Exam 2</b>	<b>Exam 2: Chs 2-5 and 21.1</b>	
Thurs, Oct 1 Lab	Read CircleD lab assignment and answer prelab questions	Create small circular segments of genomic DNA Score F <sub>2</sub> flies and linkage analysis	DNA lab assignment
Week 8- Midterms <sup>2</sup> Mon, Oct 5	Read Sanders Ch 6 - CPA 10	Bacterial and viral inheritance	CPA 10
Wed, Oct 7	Read Sanders Ch 11 - CPA 11	Chromosome structure	CPA 11
Thurs, Oct 8 Lab	Read Clean-up lab assignment and answer prelab questions	Clean-up and linearize circular DNA for PCR	F <sub>2</sub> flies data set and linkage map CircleD lab assignment

<sup>2</sup> Midterm grades will be calculated based on all work due by Monday, Oct 5.

Week and dates	Class preparation	Class topics	Assignments Due
Week 9 Mon Oct 12	Read Sanders Ch 12 - CPA 12	Mutation, DNA repair, and homologous recombination	CPA 12
Wed, Oct 14	Read Ch 13, sections 13.1 through 13.4 - CPA 13	Chromosomal mutations	CPA 13
Thurs, Oct 15 Lab	Read PCR lab assignment and answer prelab questions	PCR to amplify pigment mutant DNA	<i>Drosophila</i> linkage mapping report <sup>3</sup> Clean-up lab
Week 10 Mon, Oct 19	Read Ch 15 - CPA 14	Regulation of gene expression in eukaryotes	CPA 14 and HW 6
Wed, Oct 21		More eukaryotic gene expression control and Exam 3 review	
Thurs, Oct 22	Read DNA Seq lab assignment and answer prelab questions	Check amplified DNA on gel Hypothesize which genes are knocked out in mutants	PCR lab assignment HW 7 at end of lab class
Week 11 <b>Mon, Oct 28</b>		<b>Last day to drop any SNC class Advising starts for spring 2014</b>	
Mon, Oct 26	<b>Study for Exam 3</b>	<b>Exam 3: Chs 6, 11, 12, 13, 14, 15</b>	
Wed, Oct 28	Read Ch 16, sections 16.1 & 16.2 - CPA 15	Forward genetics	CPA 15
Thurs, Oct 29 Lab	Read GeneEx lab assignment and answer pre-lab questions	Case study on analyzing gene expression with reporter genes	DNA Seq lab assignment
<i>Fri, Oct 30</i>		<i>Nevada Day Holiday</i>	
Week 12 <b>Sun, Nov 1</b>		<b>Daylight savings time ends</b>	
Mon, Nov 2	Read Ch 16, sections 16.3 & 16.4 - CPA 16 (outline the reading)	Reverse genetics	CPA 16
Wed, Nov 4	Read Ch 17 - CPA 17 (outline)	Applications of recombinant DNA technology	CPA 17
Thurs, Nov 5 Lab	Read Analysis lab assignment and answer pre-lab questions	Analysis of pigment mutants	GeneEx lab assignment
<b>Fri, Nov 6</b>		1. <b>Grad petitions due</b> 2. <b>Spring 16 registration begins</b>	

<sup>3</sup> Students must write a lab report about either the *Drosophila* linkage mapping project or the Bacterial Mutagenesis project. If both reports are submitted, the best score will be used for the student's grade. Note: the Bacterial Mutagenesis report is due at a busier time of the semester, right before Thanksgiving.

Week and dates	Class preparation	Class topics	Assignments Due
Week 13 Mon, Nov 9  Wed, Nov 11  Thurs, Nov 12 Lab	Read Ch 22, sections 22.1, 22.2, and 22.3 - CPA 18   Read Poster lab assignment and answer pre-lab questions	Measuring evolution by natural selection  <i>Veteran's Day Holiday</i>  Work on posters	CPA 18   Analysis lab assignment
Week 14 Mon, Nov 16  Wed, Nov 18  Thurs, Nov 19 Lab	Read Ch 22, sections 22.4, 22.5, 22.7, and 22.8 - CPA 19  <b>Study for Exam 4</b> Figure out which final exam time option works best for you so you can vote on the exam	Evolution of genes and genomes  <b>Exam 4: Chs 16, 17, and 22</b>  Work on debates and print posters	CPA 19 and Bacterial mutagenesis report   Poster lab assignment Posters due
Nov 23 - 27		<i>Thanksgiving Holiday</i>	
Week 15 Mon, Nov 30  Wed, Dec 2  Thurs, Dec 3 Lab		Debate  Debate  Poster session Design class poster	Position papers due on date of your debate
Final exam week: <b>Mon, Dec 7</b>  OR		<b>Reading Day – Final exam review?</b>  BIOL 410 Final Exam  BIOL 415 (alternate) final exam slot	