

Course Code & No. - Section: BIOL 110
Course Title (Credits): Cells, Inheritance, Evolution, and Animal Systems
Term & Year: Spring/2015
Course Ref. No. (CRN):

Instructor: Gretchen Huie
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Office: TCES, room 204
Office Hours: T, TH 10am-11 am, and by appointment

Class Meeting Time: T, TH 8:30 – 9:45 a.m.
Location: TCES, room 204 BLAB

Prerequisites (from Catalog):

none

Corequisites (from Catalog):

none

Course Description

This is a foundational biology course that surveys the basics of cell structure and function, mechanisms of inheritance, evolutionary theory, the diversity of organisms on earth, and animal structure, physiology, and homeostasis. Laboratory, field experiences, and assignments will model scientific thinking, giving students practice in using evidence to evaluate hypotheses, conclusions, and generalizations. This class does not substitute for BIOL 101/105 or BIOL 102/106

Student Outcomes

The successful student will be able to:

1. Distinguish among various groups of living organisms and articulate their major roles in ecosystems
2. Articulate complexities of ecological and animal systems (physiology and homeostasis) using discipline-specific language
3. Apply concepts of inheritance and evolution by natural selection in making predictions about structure, function and activities of organisms in ecosystems
4. Analyze and propose solutions to problems related to ecology, homeostasis, and environmental sustainability using concepts and facts of cell structure and function, inheritance, evolution by natural selection, and animal systems.
5. Use evidence to critically evaluate conclusions and claims about evolution, animal physiology, and ecological systems

Methods of Assessing Student Outcomes

Student outcomes will be assessed using the following:

1. Weekly quiz;
2. Student led presentations during each class period. Discuss what this means during first class.

3. Chapter Reading and Written Summaries (see below)
4. Research Projects and Presentations (see below)
5. Written in-class, closed-book, comprehensive final examination that includes coverage of the topics discussed in the course outline.

Quizzes:

Quizzes will be open-book involving the assigned reading. If you keep up with the reading and study the questions at the end of each chapter, you should be fine.

Chapter Reading and Written Summaries:

Chapter reading and written summaries will be assigned for each class. Please summarize the chapter by addressing the bullet points below. Chapter summaries will be due at the beginning of each class period. Please limit your summaries to one page or less. I will not accept late assignments.

- What hypothesis/theory/or research does the chapter discuss
- What scientific evidence is presented in the chapter
- How does the scientific evidence discussed in the chapter apply to real world issues?

Research Project and Presentations

- 1) Presentations should be 15-20 minutes and include at least 5 PowerPoint slides. You must submit a two-page type written report that summarizes your presentation. The written report should include a minimum of five references. Two references must come from a peer-reviewed journal. I encourage you to work in groups for the presentations. I will not accept late assignments. Projects will be evaluated using a rubric posted on the Moodle site. Below I have listed the topics for each presentation.

Presentation One:

Select one of the bacterial infections below and present the following information:

Overview

- What bacteria causes the infection
- How is the bacteria commonly spread to humans
- Where (globally) is the infection most prevalent

Cellular Structure and Antibiotics

- Describe how the antibiotic targets and kills the bacteria
 - Refer to Infographic 3.5
- Explain the challenges related to the treatment

Tetanus, Typhoid, Syphilis, Tuberculosis, Pneumonia, Anthrax**Presentation Two:**

Select one of the diseases/genetic disorders below and provide the following information:

Overview

- How does the disease occur

- Specifically address what happens to the individuals cell and/or DNA to cause the disease.
- What treatments or drugs are available for the disease

Cellular Structure and DNA

- Describe how the treatments or drugs alter the individuals cells and/or DNA

Cancer, Cystic fibrosis, Sickle Cell, Down syndrome**Presentation Three:**

Select a species and report on the following:

- How is the species classified (Kingdom, Phylum, Class, Order, Family, Genus, Species)
- What are other closely related species?
- Provide a visual of the evolutionary tree that includes your selected species
- How did evolution contribute to the species structure, function, and activities in the ecosystem
- Explain how natural selection and adaptation or nonadaptive evolution contributed to the evolution of the species. Consider the following in your presentation:
 - Fitness
 - Gene Pool
 - Genetic drift
 - Bottleneck effect

Presentation Four:

- Select one of the ecosystem ecology issues listed below and discuss the science behind the topic. Explain how science is used to implement policy.
- Analyze and predict solutions related to your chosen topic using discipline related language.

Refer to Chapter 21-24 in your text for additional resources and information that can help you develop your presentation.

Global Warming, Aquatic Invasive Species, Depletion of Fresh Water, and Loss of Biodiversity***Final Exam:***

The examination will test your understanding of course readings, classroom discussions, laboratory exercises and films shown in class.

Late Assignments:

Out of fairness to other students, I have a very strict assignment and examination policy. I will not accept any papers past the due date unless a medical circumstance or family emergency is verified with me in written form. If you know that you are going to be missing a class, talk to me and arrange to turn in the paper ahead of time.

Instructional Strategies

This course is designed in lecture and laboratory format. This means there will be a portion of lecture per class. We will consider the course readings and related topics as a group and in open conversation. In order to further explore the concepts discussed in the text, we will have laboratory exercises, and be watching a series of films that we will then analyze and discuss as a group.

Required Texts and Materials

Scientific America Biology For A Changing World with Physiology/second edition (W.H. Freeman and Company). ISBN-13: 978-1-4641-5113-2 (Required)

Attendance

Attendance is mandatory. Extremely active participation may have the additional bonus of raising your course grade at the end of the quarter. Coming in excessively late and/or leaving class early will result in a lowered grade. If you know you are going to miss a class, please come and talk to me. I will assign a make up assignment.

Research Project

Any research project involving human or animal subjects must be submitted to the College Research Committee for approval. Submit your proposal to your instructor by January 30th 2014.

Class Requirements

A Laptop, a green pen, and notebook/journal are required for the class. All cell phones and pagers must be turned off or set to 'silent mode.'"

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.

1. Books (can be checked out):
In general, books related to biology have Library of Congress Classification numbers ranging from QH 300 through QK. However, you will find books related to our course with other LCC numbers, so search the Prim Library Catalog using key words related to your term paper topic.
2. Electronic databases (for peer-reviewed research articles, reviews, newspaper and magazine articles): Electronic databases likely to include articles related to your research projects are EBSCO: Academic Search Premier, 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, and National Geographic Magazine. Any of these are likely to have

articles on that relate to your research projects. 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 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.

- 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.

Grading Policy

Your grade will be calculated on the following scale:

30 Class Participation and Attendance	300	10 points each
20 Chapter Summaries	200	10 points each
4 Presentations	200	50 points each
20 Quizzes	200	10 points each
1 Final Exam	100	100 points
Total	1000	

You can select any 20 Chapter Summaries. You can select any 20 Quizzes. This means that if you miss a class or have other obligations, you can still get full credit.

Extra Credit

Other points will also be available as relate to the class.

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.

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:

Liberal Arts	Professional Preparedness
Entrepreneurial	Thinking Sustainability

Class Schedule

Week One

Introduction

Sign Lab Safety Contract

Go through Assignments, Rubrics, Expectations etc.

Lab/Activity: Working with a Microscope

Week One

Chapter Reading : Chapter 1 Process of Science

Lab/Activity: Scientific Method Using Bubble Gum

Week Two

Chapter Reading : Chapter 2 Chemistry and Molecules of Life

Lab/Activity: 1. Hydrogen Bonding

2. Enzymes Help Digest Food Handout

Film: http://www.youtube.com/watch?v=HVT3Y3_gHGg

Week Two

Chapter Reading: Chapter 3 Cell Function and Structure

Lab/Activity: Use Microscopes to Observe Human Check Cells Handout

Lab/Activity: Comparing Plant and Animal Cells Handout and reference page 43 in Life Science

Mini Lab: Osmosis reference page 62 Life Science

Week Three

Chapter Reading: Chapter 4 Nutrition, Metabolism, Enzymes

Lab: Determining Daily Energy and Macro nutrient Intake Goals

Activity: Rennin reference page 57 Life Science

Activity: Identifying Vitamin C Content reference page 450 Life Science

Week Three

Chapter Reading: Chapter 5 and 6 Photosynthesis and Respiration

Lab/Activity: 1. Cellular Respiration Handout

2. Respiration reference page 68 Life Science

Week Four

Chapter Reading: Chapter 7 DNA Structure and Replication

Lab/Activity: DNA in Bananas

Week Four**Chapter Reading:** Chapter 8 Genes to Proteins**Lab/ Activity:** Combinations of Genes. Reference page 113 Life Science**Film Clip:** [Classical vs. Transgenic Breeding](#) Discussion Questions Relating to Film**Week Five****Chapter Reading:** Chapter 9 Cell Division and Mitosis**Presentation #1****Film:** <http://www.youtube.com/watch?v=L0k-enzoeOM>**Week Five:****Chapter Reading:** Chapter 10 Mutations and Cancer and Chapter 11 Meiosis**Presentation #1****Lab/Activity:** Mitosis vs. Meiosis**Film Clip:** Epigenetics <http://www.youtube.com/watch?v=kp1bZEUgqVI>**Week Six****Chapter Reading:** Chapter 12 Single Gene Inheritances and Meiosis; Complex Inheritance**Lab/Activity:** Polygenetic Traits Handout**Film Clip:** <https://www.khanacademy.org/science/biology/heredity-and-genetics/v/genetics-101-part-1--what-are-genes>**Week Six:****Chapter Reading:** Chapter 13 Stem Cells and Cell Differentiation**Week Seven****Chapter Reading:** Chapter 14 Natural Selection and Adaptation**Lab/Activity:**http://media.hhmi.org/biointeractive/activities/stickleback/IDG_Stickleback.pdf**Film:** <http://www.hhmi.org/biointeractive/making-fittest-evolving-switches-evolving-bodies>**Week Seven****Chapter Reading:** Chapter 15 Non-Adaptive Evolution and Speciation**Lab/Activity:** How Does Evolution Occur**Week Eight****Chapter Reading:** Chapter 16 Evidence of Evolution**Lab/Activity:** Radioactive Dating reference page 143 Life Science**Film Clip:** What is Evolution? Understanding the Theory**Nova: Tiktaalik: A Fish Out of Water**

Week Eight

Chapter Reading: Chapter 17 Life on Earth

Lab/Activity: Classifying Seeds

Lab/Activity: What gives yogurt its taste? Reference page 196 Life Science

Week Nine

Chapter Reading: Chapter 18 Prokaryotic Diversity and Chapter 19 Eukaryotic Diversity

Presentation #2

Week Nine

Chapter Reading: Chapter 20 Human Race

Presentation #2

Discussion: About Race Handout

Week Ten

Chapter Reading: Chapter 21 Population Ecology

Lab/Activity: Population Dynamics. Reference PowerPoint from WHS. Create and Design Transect Population Study

Week Ten

Chapter Reading: Chapter 22 Community Ecology

Lab/Activity: Field Trip to Stream. Study of Macro-Invertebrates. Reference handouts.

Week Eleven

Chapter Reading: Chapter 23 Ecosystem Ecology

Lab/Activity: Field Trip to SNC Demonstration Garden. Investigating your Ecosystem reference page 615 Life Science

Extra Credit: Activity: page 470 number 19 and 20

Week Eleven

Chapter Reading: Chapter 24 Sustainability

Lab/Activity: Tour TERC Building

Week Twelve

Chapter Reading: Chapter 25 Overview of Physiology

Lab/Activity: TBA

Week Twelve

Chapter Reading: Chapter 26 Digestive System

Presentation #3

Week Twelve

Chapter Reading: Chapter 27 Central Nervous System

Presentation #3

Lab: Protein Digestion

Chapter Reading: Chapter 28 Reproductive Systems

Week Thirteen

Chapter Reading: Chapter 29 Immune System

Week Thirteen

Chapter Reading: Chapter 30 Plant Physiology

Presentations #4

Lab: Inside a Seed and Plant Stomata reference page 267 and 270 Life Science

Week Fourteen

Review

Presentation #4

Week Fourteen

No Class Study for Final

Week 15

Final