

ALICE LLOYD COLLEGE
SYLLABUS

Course Number and Title: Biol 413 Ecology

Instructor: Robert G. Hamilton, Ph.D.
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Office Hours: posted at office door

Meeting Times:

Lecture: TTh 10:00 – 12:15 ASC Room 404.
Laboratory: Th, 9:00 – 10:50 AM. F 8:00 – 8:50 AM. ASC Room 214

Prerequisite(s):

Biol 205, 206, 305, and senior standing in Biology or Biological Science
Education 8-12; recommended Math 250.

Course Description:

BIOL 413 Ecology 4 credit hours

This course will explore biological evolutionary and ecological processes; and the consequences of these processes on population genetics, population dynamics and population growth, and ecosystem diversity. Other topics, including genetic drift, natural selection, responses to mutation, evolutionary rates, species interactions, speciation and extinction, community ecology, and niche selection, will be presented to provide a broader view of evolutionary processes and the changes in biotic and abiotic environmental conditions that lead to changes in biodiversity.

Laboratory sessions will focus on measures of biological diversity and on critical analysis of a current issue in Ecology.

This is the capstone course for the Biology Major.

Objectives of the Course:

To familiarize the student with the concepts of Ecology and the importance of evolution in the overall structure and function of an ecosystem. The significance of population dynamics, species interactions, niche selection and population ecology will be stressed. The community will be stressed more than other levels.

The information presented during this course will be focused on specific problems. Students will be required to synthesize information into written and oral responses to key problems presented during the course as a means of

developing abilities to effectively integrate and communicate information regarding science related topics.

Critical Thinking:

Alice Lloyd College has a goal to improve the critical thinking abilities of its students. The College has adopted Paul and Elder's (2007) definition of critical thinking, which defines critical thinking as, "the art of analyzing and evaluating thinking with a view to improving it" (p. 4).

Source: Paul, R., & Elder, L. (2007). *The Miniature Guide to Critical Thinking Concepts and Tools* (4th ed.). Tomales, CA: Foundation for Critical Thinking Press.

Dress Code:

Alice Lloyd College has a long-standing tradition of emphasizing development of the total person and a commitment to personal and community enhancement. As members of the campus community, students are expected to dress modestly and appropriately for various occasions.

The College recognizes that "modest" or "appropriate" is often loosely defined in society at large. Therefore, the following guidelines are offered to assist students in choosing suitable dress:

Professional Day (Tuesday) Dress: Professional dress will be required of all students on central campus until 2:00 p.m. and for all convocation programs. Central campus includes all of the campus buildings with the exception of the gym, maintenance building, fitness center, and the residence halls.

Note: Professional Dress is defined as attire appropriate for professional business presentation or job interviews.

Professional Dress for Men (all items listed together must coordinate) consists of:

Business suit, dress shirt (tucked in), tie, belt, dress socks and coordinating dress shoes or boots.

Sport coat, dress slacks, dress shirt (button-down long/short sleeve, tucked in), belt, tie, dress socks and coordinating dress shoes or boots.

Men's Shoes:

Polished lace-up or slip on shoes,

Polished dress boots

Professional Dress for Women (all items listed together must coordinate) consists of:

Business pants suit (Coordinating jacket/pants), blouse, hosiery/matching trouser socks, and appropriate dress shoes.

Business skirt suit (Coordinating jacket/skirt), blouse, nylons, and appropriate dress shoes.

Business dress with sleeves or coordinating jacket, nylons, and appropriate dress shoes.

Women's Shoes:

Dress shoes with heel no higher than 2"

Professional open-toed with/without a back strap with heels no higher than 2"

Knee-length dress boots with heel no higher than 2"

Requirements for the Course:

Students will be required to:

1. attend scheduled class lectures, take all exams and quizzes, and complete all written assignments.
2. read regularly the assigned text material and associated supplementary readings.
3. demonstrate an understanding of the science associated with ecology.
4. demonstrate the ability to integrate knowledge into an understanding of ecology.
5. participate in group tasks, oral discussions, and individual efforts as apply to the responsive questions and critical-thinking tasks.

Technology:

Students will be encouraged to access on-line resources and websites to complete online assignments and supplement their class lecture and laboratory readings.

Diversity:

Ecology is a very broad science. Ecological issues affect many aspects of our daily lives, and explain many of the social and cultural differences among peoples of the world. In lecture and lab, learning will involve information from many areas of science and many different parts of the world.

Writing Across the Curriculum:

This course will employ opportunities for students to display their verbal and written skills. Reports and problem sets, where the student's grammar, spelling and critical thinking will be evaluated.

Resources and Materials:

Textbook:

Cain, Michael I., William Bowman and Sally Hacker. 2017. Ecology. 4th edition. Sinauer. ISBN (**REQUIRED**) 978-1-60535-618-1. Associated website:

<http://www.sinauer.com/ecology4e>

Computer labs purchased from simbio.com. The labs cost \$30.00.

Attendance Policy:

Attendance is required for all scheduled lectures as well as the laboratory sections. Prompt arrival to class is expected. As per ALC policy, any student with an absentee rate $\geq 20\%$, *regardless of whether the absences are excused or unexcused*, will fail the course. It is the *student's responsibility* to make every attempt to contact the instructor in advance to notify her of officially excused absences (e.g., professional school interviews, participation in college sanctioned events, etc.) in order to make alternative arrangements to complete any work that would be due during the excused absence. It is the *student's responsibility* to contact the instructor as soon as possible following any unforeseeable emergency (e.g., illness, accident, family emergency, etc.) in order to be given any extensions on deadlines for completion of any missed assignments. It is the *student's responsibility* to clear any absences with the Office of the Academic Dean. It is the *student's responsibility* to complete any and all assignments and to turn them in to be graded in a timely manner.

Make-up and late policies:

Tests can be made up if the student notifies the instructor in advance and a make up date arranged prior to the date of the test. It is important to return tests as quickly as possible, and so delays due to make up will be reduced as much as possible.

Problem sets will have the grade reduced by 10% for each day late.

You cannot miss your presentations. We will negotiate presentation times well in advance, and subsequent conflicts must be resolved prior to the presentation date in any event.

Policy on Plagiarism:

The ALC faculty has officially adopted the following policy on plagiarism:

“Plagiarism is the act of using another’s idea or expression in your writing without acknowledging the source...In short, to plagiarize is to give the impression that you have written or thought something that you have in fact borrowed from someone else” (21)

“Plagiarism often carries severe penalties, ranging from failure in a course to expulsion from the school.”

“The most blatant form of plagiarism is to repeat as your own someone else’s sentences, more or less verbatim...” (22)

“Other forms of plagiarism include repeating someone’s particularly apt phrase without appropriate acknowledgement, paraphrasing another person’s argument as your own, and presenting another’s line of thinking as though it were your own...”(23)

Source: Gibaldi, Joseph. *MLA Handbook for Writers of Research Papers*. 3rd ed. New York: Modern Language Association of America, 1988.

Evaluation:

Midterm exams:

There will be 3 midterm exams during the semester. Each midterm will cover a different section of the course. 30% of your grade will be attributed to midterm exams. Each exam is thus worth 10% of your final grade.

Final Exam:

Comprehensive lecture exam. Worth 15% of the final grade.

Laboratory

Computer Labs:

There are 5 online computer labs assigned during the semester. Exercises for each lab will be worth 2% each. Graded evaluations of computer labs will be worth 3% each. Total for each lab will be 5% of your final grade and total for all computer labs will be 25% of your final grade.

Laboratory assignment:

We are going to investigate the conjecture that CO₂ affects the temperature of the earth's atmosphere. We are specifically going to look the question: Does the CO₂ in the trophosphere have any effect on the thermal properties of the trophosphere? Why do we think it does? Why do we think it doesn't? What are the strengths and weaknesses of the differing views. The emphasis is on science, and thus empirical evidence will be required for any solid conclusions, and limited in scope to what is allowed by the actual empirical data. We will look at psychologism, tautology, affirmation of the consequent, pseudoscience and other basic philosophical constructs that relate to this sort of argument and students will be expected to define their arguments using such concepts.

Write a 2000 word minimum essay outlining this issue, and analyze points of view from the perspective of being scientific or not and being logical or not. You must take positions on the scientific and logical validity of the points you raise and support those positions. Report is worth 10% of your final grade.

Critical Thinking Assignments:

Lectures will include critical thinking exercises. Assigned exercises will be worth 10% of the final grade.

The computer labs, the major lab exercise on the effects of CO₂ on the atmosphere and the critical thinking assignments associated with lectures represent the critical thinking component of this course.

Grading:

The final grade for the course will be calculated based on the following formula:

Midterm exams (collectively)	30% of total grade
Final Exam.....	15% of total grade
Computer Labs (collectively).....	25% of total grade
Essay on CO2	10% of total grade
Critical Thinking Problems.....	10% of total grade
Biodiversity report.....	10% of total grade

The following scale will be used for assigning grades:

- A = 90-100
- B = 80-89
- C = 70-79
- D = 50-69
- F = ≤ 49

Lecture Schedule (tentative):

- Midterm 1:**
 chapters 1 – 4.
- Midterm 2:**
 chapters 5 - 8.
- Midterm 3:**
 Chapters 9 – 15.

Laboratory Schedule (tentative). Divided into 3 sections:

Section 1. Biodiversity.

1.
 - a) **What is biodiversity. What do we measure? What are some of the different measures of biodiversity. What are the advantages and weaknesses of different measures?**
 - b) **Measures of Biodiversity. What are some of the different measures of biodiversity. What are the advantages and weaknesses of different measures? Measuring diversity using Fisher’s alpha. We will assess the diversity of automobiles on campus using this method.**
2. **Measuring biodiversity using Fisher’s alpha. We Fisher’s alpha to measure automobile diversity on campus.**
3. **Measuring biodiversity using Fisher’s alpha. We Fisher’s alpha to measure tree diversity on campus.**

Report on Diversity

Section 2. Computer Labs.

- 4. Intermediate Disturbance**
- 5. Isle Royale**
- 6. Liebigs Barrel**
- 7. Epidemiology Tutorial**
- 8. Niche Wars.**

Section 3. Critical Thinking.

9. What is science? What makes an argument scientific? What are some common logical fallacies?

10. Does CO₂ affect the thermal properties of the atmosphere? Why do people think it does? Why do people think it doesn't? Are the arguments scientific? Are they logical?