BIOS 1040 Introduction to Sustainability

CENTRAL COMMUNITY COLLEGE

INSTRUCTOR

COURSE INFORMATION

This course covers the essential concepts of sustainability, including the history of United States Environmental Policy, Climate Change, Biogeochemical Cycles, Water Cycles, and Sustainable Infrastructure. The course also seeks to develop student abilities in interdisciplinary applied thinking. It is a foundation course for students planning to major in renewable energy, pre-professional programs in science and health, and other clean technology fields. Includes lab. (45/0/0/0)

Proposed change to course description: This course covers the essential concepts of sustainability including the history of United States Environmental Policy, Climate Change, Biogeochemical Cycles, Water Cycles, and Sustainable Infrastructure. (45/0/0/0)

Credits: 3
Total Hours: 45

CLASS INFORMATION

TEXTBOOKS

Sustainability; A Comprehensive Foundation

Tom Theis and Jonathan Tomkin, Editors

GRADING INFORMATION

Grading Information

98-100	A+
90-97	A
87-89	B+
80-86	B

77-79	C+
70-76	C
67-69	D+
60-66	D
≤59	F

Methods of Evaluation

There will be three major exams and a cumulative final exam covering lecture material and eleven quizzes with your lowest quiz dropped from your final grade.   You should expect a short quiz every week. Also, each student will be involved in a group project related to College sustainability and will complete some other miscellaneous homework assignments. Ten percent of the final grade will be based on attendance.

 The completion of the Sustainability project may meet some requirements for achieving an "e-Badge" award in sustainability that would be displayed on the College transcript.

4 Exams @ 50 pts…………… 200 pts

10 quizzes …………………………… 100 pts

Sustainability Project ……………… 100 pts

Assignments……………………….. 40 pts

Discussions……………………….. 40 pts

Attendance………………………… 20 pts

Total….. 500 pts

COURSE COMPETENCIES

1. Explore sustainability in its modern context.

Criteria

Performance will meet expectations when the student:

- defines essential aspects of "sustainability."
- gives examples "strong" and "weak" sustainability.
- states the meaning of the "IPAT" equation.
- calculates the current year's IPAT.
- describes the "rebound effect."

Learning Objectives

- Define "IPAT" equation variables.
- Describe patterns of human consumption.
- Identify major factors that contribute to unsustainable impacts.
- Explain the "rebound effect."

2. Explore historical influences on U.S. environmental policy.

Criteria

Performance will meet expectations when the student:

- analyzes case studies related to policy development.

- describes risk management in policy.
- describes three health impacts of climate change.
- identifies inputs and outputs of modern farming.
- names health effects associated with major sources of energy.

Learning Objectives

- Explains the problem-driven nature of policy development.
- Describe the basis for environmental policy.
- Compare health impacts of sustainable versus non-sustainable development.
- Review the impact of modern farming practices.
- Name major energy sources.
- Link human health to types of energy consumption.

3. Review the science of climate change.

Criteria

Performance will meet expectations when the student:
- explains how climate and weather are related.
- compares insolations in different Earth locations.
- describes the mechanisms by which major external and internal changes to the climate (including solar output variation, volcanoes, biological processes, changes in glacial coverage, and meteorite impacts) operate.
- explains changes in insolation, albedo, and atmospheric composition of Earth.
- describes the processes that can lead to a "Snowball Earth" using the "positive feedback" concept.
- examines the major ways in which carbon dioxide is both added to and removed from the atmosphere.

Learning Objectives

- Define both climate and weather and explain how the two are related.
- Outline the role and mechanisms of the major controls on Earth's climate.
- Identify and describe the mechanisms by which major external and internal changes to the climate.
- Recognize that the Earth's climate has changed greatly over its history as a result of changes.
- Describe the processes that can lead to a "Snowball Earth" using the "positive feedback" concept.
- State the major ways in which carbon dioxide is both added to and removed from the atmosphere.

4. Investigate atmospheric dynamics.

Criteria

Performance will meet expectations when the student:
- identifies evidence of climate change.
- provides examples of enhanced greenhouse effects.
- evaluates regional climate change case studies.
- compares historical CO_2 emissions budgets of different countries.

Learning Objectives

- Explain the impact of changes in the Sun's energy output.
- Interpret the human impact on the planetary albedo.
- Explain the enhanced greenhouse effect.

- Discuss how recent observations of change measured within regional ecosystems are related to global climate change.
- Explain atmospheric dynamic resources, e.g. Intergovernmental Panel on Climate Change (IPCC) and emission maps.
- Discuss the relationship between fossil fuel usage and CO2 emissions.
- Discuss the differences between weather forecasting and climate projections.

5. Identify biochemical cycles.

Criteria

Performance will meet expectations when the student:

- describes the concept of a biogeochemical cycle.
- replicates through diagrams all the natural cycles of carbon, water, and nitrogen.
- shows examples of current human disruption by consulting current case studies.

Learning Objectives

- Describe the concept of a biogeochemical cycle, incorporating the terms "pool" and "Flux."
- Describe the natural cycles of carbon, water, and nitrogen.
- Name some of the important ways human activity disrupts those cycles.

6. Evaluate the importance of biodiversity.

Criteria

Performance will meet expectations when the student:

- identifies current trends on biodiversity loss through threatened and endangered species populations summaries.
- outlines how human activity affects biodiversity through land use change and habitat fragmentation.
- explains in terms of monetary value the ecological services of biodiversity loss.

Learning Objectives

- Recall current trends in biodiversity loss with reference to species and ecosystems.
- Recognize some of the ways human activity affects biodiversity.
- Examine how biodiversity loss concerns people.

7. Explain water management.

Criteria

Performance will meet expectations when the student:

- outlines the movement of water to different reservoirs at and below earth's surface.
- describes with USGS figures, the principles affecting groundwater resources recharge and how it interacts with surface water.
- recognizes the cause and effects of depletion in different water reservoirs.
- describes the strategies to help control water flow.
- enumerates examples of point and non-point sources of pollution and how they affect the water quality.
- describes the sewage treatment process to remove organic waste.

Learning Objectives

- Describe how the water cycle operates.
- Describe the principles controlling groundwater resources and the affect on surface water.

- Indicate the causes and effects of depletion in different water reservoir.
- Recognize how we can work toward solving the water supply crisis.
- Explain the major kinds of water pollutants and how they degrade water quality.
- Outline what sewage treatment does and why it is important.

8. Summarize the importance of mineral resources.

Criteria

Performance will meet expectations when the student:

- calculates common everyday mineral use in your home as well as per capita consumption.
- identifies finite supplies of global minerals by production, reserves, as well as estimated life of current reserves.
- examines future depletion of most minerals by 2030.
- consults case studies of surface mines, acid drainage, and processing of minerals through smelting.
- identifies mineral conservation strategies such as efficiency, substitution, and the 3R's of sustainability.

Learning Objectives

- Identify the importance of minerals to society.
- List factors that control availability of mineral resources.
- Indicate why future world mineral supply and demand is an important issue.
- Describe the environmental impact of mining and processing of minerals.
- Identify how we can work toward solving the crisis involving mineral supply.

9. Value sustainable infrastructure.

Criteria

Performance will meet expectations when the student:

- explores connections between energy, transportation, use, materials and waste, and food source to design a more sustainable city.
- examines how small changes in everyday consumption patterns can make a big difference as a whole in reducing consumption patterns.
- explores how changes in the built environment and the materials used can be certified sustainable.
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- compares the automotive-based system of transportation with smart planning using case studies to show how cities are becoming more sustainable.
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Learning Objectives

- Describe what a sustainable city will look like and what it will mean to live in one.
- Explore the connections between the design of our cities and resource use.
- Examine how one's lifestyle will have to be altered in order to live more sustainably.
- List the various ways buildings affect the environment.
- Explain why the automobile-based system of transportation is unsustainable in terms of inputs, outputs, and social impacts.

CCC-AMERICANS WITH DISABILITIES ACT

If you have a disability or want to know if you qualify for accommodations as defined by the Americans with Disabilities Act, you are invited to contact the campus Director of [Disability Support Services](). You are not required to disclose or reveal information about your disability to anyone at any time, however, in order to receive accommodations in college, you must make those needs known and request services from the Disability Support Services office on one of the three CCC campuses. Inquiries concerning the application of the laws and regulations cited above may be directed to the Human Resources Office, Central Community College, P.O. Box 4903, Grand Island, NE 68802-4903; (308) 398-7325, or to the Director, Office of Civil Rights, U.S. Department of Education, Washington, DC 20201.

CCC-ARCHIVING OF STUDENT WORK

To protect the original work of students from plagiarism and to uphold the high academic standards and integrity of CCC, any written assignment in this course may be submitted to an internet based plagiarism detection service such as [Turnitin.com]() by the student or the instructor. All submitted written assignments will be archived and may be referenced for the purpose of detecting plagiarism.

CCC-ATTENDANCE--ONLINE, FACE-TO-FACE, HYBRID

Central Community College faculty record attendance in courses- including online courses. Class attendance and participation contribute significantly to student academic success. Commonly, students who attend class get more out of their college investment through increased learning, stronger relationships with instructors and classmates, earning higher grades, achieving increased passing rates in courses, which leads to completion of academic, and ultimately, career goals. Attendance in an online course may include timely participation in discussions, submitting assignments, activities, projects, etc. (i.e. completing assignments by their deadline). Students should regularly participate in weekly course activities as led by your instructor to ensure meeting attendance requirements. Failure to consistently attend class(es) - even online class(es) - may jeopardize your financial aid.

CCC-COURSE MEETING TIME AND LOCATION

Course meeting time and location may be found in **WebCentral** through My Services, Services for Students, Academic Planning, Student Planning, Go to Plan & Schedule, Timeline tab or use this quick link:

[Student Planning Timeline Tab]() > Sign In, if applicable > Navigate to Term > Click on Course Name

CCC-EQUAL OPPORTUNITY/AFFIRMATIVE ACTION

Central Community College does not discriminate on the basis of race, religion, national origin, gender, age, disability, marital status, or military veteran status as is defined by law in employment, admission, scholarship and financial aid programs or operation of its educational programs and activities as prescribed by Titles VI and VII of the Civil Rights Act of 1964, Title IX of the Education Amendments of 1972, Executive Order 11246 as amended, sections 503 and 504 of the Rehabilitation Act of 1973, the Vietnam Era Veteran's Readjustment Assistance Act of 1974, the Age Discrimination Acts of 1974 and 1975, and other federal and state laws and regulations.

Central Community College offers career and technical education programs for all students regardless of race, color, national origin, age, religion, marital status, including those with limited English proficiency, sex or disability. For a complete list of programs, go to [www.cccneb.edu/programs](). Educational programs are offered at but not limited to the following locations: Columbus Campus, Grand Island Campus, Hastings Campus, Holdrege Center, Kearney Center, Lexington Center and Ord Learning Center.

CCC-EXPECTATIONS FOR ACADEMIC INTEGRITY

Central Community College believes successful students are independent critical thinkers who possess the work ethic and skills necessary to make a positive difference in their professions and communities. In order to maximize student and community success, CCC is devoted to maintaining an honest academic environment and upholding integrity as a core value. All individuals across all course modalities are expected to practice academic integrity, which encompasses the fundamental values of honesty, trust, respect, fairness, and responsibility. In the case of alleged violations of academic integrity, Central Community College strives for fair resolution.

Instances of Academic Dishonesty:
Behaviors that violate the fundamental values of academic integrity at Central Community College
may include but are not limited to the following:

- Plagiarism - direct copying or paraphrasing without citation someone else's work (i.e. writing, images, video or audio)

- Cheating - engaging in any behavior intended to achieve an unfair advantage for self or another in any academic exercise (i.e. unauthorized collaboration or unauthorized use of resources or data in a study)

- Fabricating Information - inventing or falsifying information (i.e. making up resources and/or citations, falsifying academic records)

- Facilitating Academic Dishonesty - soliciting, furnishing, or offering to furnish unauthorized exams, quizzes, or academic materials; participating in academic sabotage

Read the Expectations for Academic Integrity in its entirety.

CCC-GENERAL INFORMATION

All college policies and procedures identified in the student handbook will be adhered to for the course. College policies and procedures include, but are not limited to, conditions for dropping or withdrawing from a class, student academic honesty, etc. A copy of the student handbook is available upon request from the Student Services office on each campus or you may utilize this link to the Student Handbook.

CCC-TECHNOLOGY USAGE GUIDELINES

In order to support the activities for this course, Central Community College provides access to computers for students. The College established Technology Use Policy and Procedure documentation. This document can be found on the College web site. You may click this link to download a PDF document outlining the College's Technology Use Guidelines.

CCC-TITLE IX POLICY

Members of the Central Community College community, guests and visitors have the right to be free from all forms of gender and sex-based discrimination, examples of which can include acts of sexual violence, sexual harassment, domestic violence, dating violence, and stalking. All members of the campus community are expected to conduct themselves in a manner that does not infringe upon the rights of others. Any member of the community, guest or visitor who believes that the policy on Equal Opportunity, Harassment and Nondiscrimination has been violated should contact the Title IX/Equity/AA Coordinator, Dr. Christopher Waddle, 308-398-7325 or TitleIXCoordinator@cccneb.edu. Students should understand that in cases of gender and sex based discrimination, no College employee, including members of the

faculty, can guarantee confidentiality. For more information about CCC's policy please reference CCC's [Title IX Handbook](). For counseling services which may remain confidential, CCC counselors are available for free to all currently enrolled students. To schedule an appointment or to receive additional information contact 402-562-1244 or email [counselingservices@cccneb.edu]().

Pregnancy Rights and Responsibilities

Title IX makes it illegal to discriminate on the basis of pregnancy and related conditions. All pregnancy concerns and pregnancy related absences are coordinated by the Disability Services office. You may not anticipate any academic needs associated with your pregnancy, however, your needs may change as your pregnancy progresses. Disclosure of your condition early in the pregnancy will help in making the planning process more proactive. To disclose your pregnancy to ensure proper accommodations and support, please contact the [Disability Services Director]() on your campus. For additional information related to pregnancy rights and responsibilities, please visit [https://www.cccneb.edu/pregnantandparenting]() or contact you campus Disability Services Office or CCC's Title IX Coordinator at [titleixcoordinator@cccneb.edu]()

COVID-19 REQUIREMENTS AND EXPECTATIONS

Students diagnosed with COVID-19 are expected to confidentially report this information to any Associate Dean of Student Success or by calling our Grand Island Office at 308-398-7426. Further, Central Community College instructors will support flexible attendance for students exhibiting symptoms or illness.

Specific instructional programs may require industry-specific personal protective equipment (PPE) that must be maintained.

Central Community College reserves the right to require face coverings and to change mode of delivery, instructor, or class schedule due to pandemic response at the college, at a location, or in the community.