

The University of Oklahoma
College of Liberal Studies
The Dynamic Universe
LSTD 3433 Section 713
June 7, 14, 21, 28 July 5, 12, 19, 26
5:30-9:30 p.m.
Rose State College
Tom Steed Center – Room 203

Professor: Dr. Anthony J. Stancampiano
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Course Description:

This course addresses the evolution of the Universe through consideration of the laws that govern its behavior. Topics that will be explored include: the Big Bang; the formation of matter, planets, and stars; stellar evolution; the Earth's structure; rocks; minerals; plate tectonics; geological formations; atmospheric dynamics and structure.

This course assumes that students have a basic understanding of classical physics, especially the concepts included in Newton's laws of motion, gravity, energy, momentum, and kinetic theory of gases. If you need to refresh yourself on these concepts, you should review the appropriate chapters in the text, Introduction to the Physical Sciences. This includes Chapter 3: Newton's Laws of Motion, Gravity, and Momentum; Chapter 4: Energy, and Chapter 5: The Kinetic Theory of Gases. These concepts will be referred to a number of times throughout the readings for this course.

Course Objectives:

Upon successfully completing this course, the student will be able to:

- Explain the basic understanding of the origin of the universe, including the Big Bang theory.
- Explain the formation and structure of the Earth, moon, planets, stars, and black holes.
- Demonstrate an understanding of the structure of rocks, minerals, and water.
- Explain tectonics, plate movements, and island formation.
- Define and discuss atmosphere, wind storms (especially tornados), and clouds.
- Discuss the dynamic universe in terms of interdisciplinary thinking, community building, and world disaster concerns.

Course Format: A combination of lecture, discussion, videos, group projects, and individual study will be used.

Course Requirements:

Both **class attendance** and participation in **class activities**, such as discussions and group projects, are important aspects of the course. Therefore, a portion of your grade will be based on these factors.

Texts:

Hawking, Stephen. *A Brief History of Time*. 10th Anniversary Ed. Bantam Doubleday Dell.

Shipman, J.T., Wilson, J.D., and Todd, A.W., 2006. *An Introduction to Physical Science* 12th Ed. Houghton Mifflin.

Grading information:

25% Class Participation (attendance and in-class activities)

25% Group Project/Presentation

25% Observation Notebook

25% Exploration Essays

Grading scale:

>90% A

80%-89.99999% B

70%-79.99999% C

60%-69.99999% D

<60% F

There will be no curving of grades in this course.

Coursework Description:

Class Participation:

Attendance at each class is extremely important due to the limited number of class meetings. Additionally, there will be four in-class activities that will be conducted during class in small groups. These can only be completed in class. **If the student is absent, the activities cannot be made-up.**

Individual Project/Presentation:

A list of topics will be presented in the first class meeting. Students may choose to complete this assignment as a 10 minute in-class presentation or a 7-10 page (body), typewritten, double spaced paper. These will be due at the next to last class meeting (7/19).

Observation Notebook:

Students will be given a list of 4 possible assignments, of which 2 must be completed for credit. These activities will be documented as required in the handout and will be due at the next to last class meeting (7/19).

Exploration Essays:

There will be a total of 4 essays assigned out of a list of potential topics. These will be assigned throughout the semester and will be due every other Thursday class meeting after the initial meeting. (6/14, 6/28, 7/12, 7/26)

Academic Misconduct statement:

Any act which improperly affects the evaluation of a student's academic performance or achievement, including but not limited to the following:

- (a) Cheating: the use of unauthorized materials, methods, or information in any academic exercise, including improper collaboration;
- (b) Plagiarism: the representation of the words or ideas of another as one's own, including:
 - (1) direct quotation without both attribution and indication that the material is being directly quoted, e.g. quotation marks;
 - (2) paraphrase without attribution;
 - (3) paraphrase with or without attribution where the wording of the original remains substantially intact and is represented as the author's own;
 - (4) expression in one's own words, but without attribution, of ideas, arguments, lines of reasoning, facts, processes, or other products of the intellect where such material is learned from the work of another and is not part of the general fund of common academic knowledge;
- (c) Fabrication: the falsification or invention of any information or citation in an academic exercise;
- (d) Fraud: the falsification, forgery, or misrepresentation of academic work, including the resubmission of work performed for one class for credit in another class without the informed permission of the second instructor; or the falsification, forgery or misrepresentation of other academic records or documents, including admissions materials and transcripts; or the communication of false or misleading statements to obtain academic advantage or to avoid academic penalty;
- (e) Destruction, misappropriation or unauthorized possession of University property or the property of another;
- (f) Bribery or intimidation;
- (g) Assisting others in any act proscribed by this Code; or
- (h) Attempting to engage in such acts.

Penalties are listed in the Academic Code. For further information on academic misconduct please refer to the following link: <http://www.ou.edu/provost/integrity/>

Disability Statement:

Disability Issues: Any student in this course who has a disability that may prevent her or him from fully demonstrating his or her academic abilities should contact Frank Rodriguez (405-325-1061) as soon as possible to discuss the accommodations necessary to ensure full participation and to facilitate your educational opportunities. For further information on disability issues please refer to the following link:

<http://www.dsa.ou.edu/ods/index.html>

Dr. Anthony J. Stancampiano earned his Ph.D. in Zoology from the University of Oklahoma in 1999. Additionally, he has a B.S. in Biology from the University of Central Oklahoma and an M.S. in Biology from the University of Central Oklahoma. He has been a faculty member at OCCC since 1995, where he is course coordinator for Zoology, Comparative Vertebrate Anatomy, and Ecology and Environmental Issues courses. Areas of research interest include mammalian ecology, landscape ecology, and geographic information systems.

Course Outline:

Unit 1— June 7, 14

The Origin of the Universe

This unit will focus on the history of our universe, the sun the celestial sphere, the life Cycle and low-mass and high-mass stars, galaxies, and cosmology. Additionally, consideration of the Scientific Method as a critical tool will be introduced.

Reading Assignments:

Hawking, Chapter 1-8
Shipman, Wilson, and Todd, Chapter 18

Topics and Themes to be Explored:

The Scientific Method
The Big Bang
Our Place in the Universe
Formation of Matter
Starlight
Formation of Stars
Formation of Planets (in part)
Deaths of Stars

Unit 2— June 21, 28

The Dynamic Earth

This unit will examine the origins and the structure of the Earth and the Moon as well as the structure of minerals. The function of water on changing the surface of the Earth will further be explored.

Reading Assignments:

Shipman, Wilson, and Todd, Chapters 15, 17, 21

Themes and Topics to be Explored:

Origins of the Earth
Origins of the Moon
Structure of the Earth (comparison and contrast with its neighbors)
Structure and formation of Rocks
Structure of Minerals and Gemstones
The work of Water

Unit 3— June 28, July 5, 12

Plate tectonics

This unit focuses on the structural geology of the Earth. In this unit students will explore continental drift and seafloor spreading, plate tectonics, earthquakes and the Earth's interior, crustal deformation, and mountain building.

Reading Assignments:

Shipman, Wilson, and Todd, Chapter 22, 23

Topics and Themes to be Explored:

Plate Tectonics
Plate Movement
Volcanism and Earthquakes
Island Formation

Unit 4— July 12, 19

The Atmosphere

This unit explores the atmosphere of the Earth as well as atmospheric effects. The student will examine atmospheric composition and structure, atmospheric energy content, atmospheric measurements and observation, air motion, condensation and precipitation, air masses, storms, atmospheric pollution, and pollution and climate.

Reading Assignments:

Shipman, Wilson, and Todd, Chapters 19, 20.

Topics and Themes to be Explored:

Composition and Structure of the Atmosphere
Creation and role of Winds
Formation and Classification of Clouds
Structure and Formation of Storm Systems

Presentations— July 19, 26