**PHYSC 21 Course Outline as of Fall 2013**

# CATALOG INFORMATION

Dept and Nbr: PHYSC 21 Title: EARTH SCIENCE
Full Title: Introduction to Earth Science
Last Reviewed: 3/9/2020

| Units | | Course Hours per Week | | Nbr of Weeks | Course Hours Total | |
|---|---|---|---|---|---|---|
| Maximum | 4.00 | Lecture Scheduled | 3.00 | 17.5 | Lecture Scheduled | 52.50 |
| Minimum | 4.00 | Lab Scheduled | 3.00 | 6 | Lab Scheduled | 52.50 |
| | | Contact DHR | 0 | | Contact DHR | 0 |
| | | Contact Total | 6.00 | | Contact Total | 105.00 |
| | | Non-contact DHR | 0 | | Non-contact DHR | 0 |

Total Out of Class Hours: 105.00 Total Student Learning Hours: 210.00

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|---|---|
| Title 5 Category: | AA Degree Applicable |
| Grading: | Grade or P/NP |
| Repeatability: | 00 - Two Repeats if Grade was D, F, NC, or NP |
| Also Listed As: | |
| Formerly: | |

**Catalog Description:**
A survey course providing an introduction to the Earth sciences, including geology, oceanography, meteorology, and astronomy. This course focuses on the interactions between various Earth systems such as plate tectonics, the hydrologic cycle, the rock cycle, weather and climate, and Earth's place in the universe. This course is primarily designed for those intending to pursue an elementary teacher education program.

**Prerequisites/Corequisites:**

**Recommended Preparation:**
Eligibility for ENGL 1A or equivalent

**Limits on Enrollment:**

**Schedule of Classes Information:**
Description: A survey course providing an introduction to the Earth sciences, including geology, oceanography, meteorology, and astronomy. This course focuses on the interactions between various Earth systems such as plate tectonics, the hydrologic cycle, the rock cycle, weather and climate, and Earth's place in the universe. This course is primarily designed for those intending

to pursue an elementary teacher education program. (Grade or P/NP)
Prerequisites/Corequisites:
Recommended: Eligibility for ENGL 1A or equivalent
Limits on Enrollment:
Transfer Credit: CSU;UC.
Repeatability: Two Repeats if Grade was D, F, NC, or NP

## ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:

| | | | | |
|---|---|---|---|---|
| **AS Degree:** | **Area** | | Effective: | Inactive: |
| | C | Natural Sciences | Fall 2025 | |
| | L5 | Physical and Biological Sciences | | |
| | C | Natural Sciences | Fall 2014 | Fall 2025 |
| **CSU GE:** | **Transfer Area** | | Effective: | Inactive: |
| | B1 | Physical Science | Fall 2014 | |
| | B3 | Laboratory Activity | | |
| **IGETC:** | **Transfer Area** | | Effective: | Inactive: |
| | 5A | Physical Sciences | Fall 2014 | |
| | 5C | Fulfills Lab Requirement | | |

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|---|---|---|---|---|
| **CSU Transfer:** | Transferable | Effective: | Fall 2014 | Inactive: |
| **UC Transfer:** | Transferable | Effective: | Fall 2014 | Inactive: |

**CID:**
CID Descriptor: GEOL 121 Earth Science with Lab
SRJC Equivalent Course(s): PHSC21

**Certificate/Major Applicable:**
Major Applicable Course

## COURSE CONTENT

**Student Learning Outcomes:**
At the conclusion of this course, the student should be able to:
1. Apply scientific techniques to solve Earth science-related questions.
2. Relate concepts, principles and interactions of Earth's systems.
3. Practically apply concepts of Earth's systems.
4. Differentiate among and classify common minerals and rocks.
5. Identify and characterize surface processes.
6. Interpret how the universe, particularly the Earth, changes over time.
7. Communicate complex course concepts effectively in writing and diagrams.

**Objectives:**
Upon completion of the course, students will be able to:
1. Define the nature of science and solve problems using the scientific method.
2. Summarize the relationships among the rock cycle, plate tectonics, geologic structures, volcanism and earthquake activity.
3. Differentiate rocks and minerals; identify and describe specific rocks and minerals.
4. Quantify geologic time and use relative and radiometric dating methods to interpret Earth's

history.
5. Describe surface processes and identify associated landforms.
6. Explain processes and identify features associated with oceans and shorelines.
7. Explain and diagram Earth-Sun and Earth-Moon relationships.
8. Use maps to recognize and interpret global weather and climate patterns.
9. Explain and measure aspects of weather and climate.
10. Compare and contrast physical properties of astronomical bodies.
11. Construct a Hertzsprung-Russell Diagram and summarize the processes that occur as stars evolve.
12. Summarize the fundamental concepts of cosmology.
13. Evaluate interactions between humans and Earth systems.

**Topics and Scope:**

I. Introduction to Earth Science
   A. Earth Science Principles
   B. The Scientific Method
II. Earth Materials
   A. Minerals
   B. Rocks
      1. The Rock Cycle
      2. Igneous Rocks
      3. Sedimentary Rocks
      4. Metamorphic Rocks
   C. Soils
III. Earth's External Processes
   A. Weathering and Erosion
   B. The Hydrologic Cycle
      1. Surface Water
      2. Groundwater
   C. Glaciers
   D. Deserts
IV. Earth's Internal Forces
   A. Earth's Internal Structure
   B. The Theory of Plate Tectonics
   C. Crustal Deformation
   D. Earthquakes
   E. Volcanic Activity
   F. Intrusive Igneous Activity
V. Earth History
   A. Key Principles of Relative Dating
   B. Fossils and Fossilization
   C. Radiometric Dating
   D. The Geologic Time Scale
VI. Oceans
   A. Features of the Ocean Floor
   B. The Dynamic Ocean
      1. Currents
      2. Shorelines
      3. Tides
VII. Weather and Climate
   A. Atmosphere

1. Composition
2. Vertical Structure
3. Ozone Depletion

B. Earth-Sun Relationships
1. Earth's Motions
2. Seasons

C. Solar and Terrestrial Radiation
1. Electromagnetic Radiation and our Atmosphere
2. Heat-Transfer Mechanisms
3. Greenhouse Effect

D. Temperature
1. Controlling factors
2. Global patterns

E. Atmospheric Pressure and Wind

F. Water and Atmospheric Moisture

G. Weather Systems

H. Climate

VIII. Earth's Place in the Universe

A. Origins of Modern Astronomy

B. The Solar System
1. The Earth and Moon
2. Other Major Planets
3. The Sun
4. Small Solar System Bodies

C. Stars and the Interstellar Medium
1. Interstellar Matter
2. Classifying Stars
3. Stellar Evolution
4. Stellar Remnants
5. Galaxies and Galactic Clusters
6. Cosmology

IX. Laboratory and/or Field Trip Material (at least 10 of the following topics will be covered)

A. Scientific Method

B. Plate Tectonics, Earthquakes and Volcanoes

C. Mineral Properties and Identification

D. Rock Properties and Identification

E. Structural Geology

F. Groundwater and Subsidence

G. Surface Processes

H. Geologic Time and Dating Earth Materials

I. Oceans

J. Weather Systems and Atmospheric Moisture

K. Astronomy

**Assignment:**

1. Assigned readings (30-50 pages per week)
2. Homework (5-15): essays, written homework, lab reports, problem solving exercises
3. Research papers (1-3, 3-6 pages each)
4. Laboratory activities (10-15): calculations, diagram construction, rock and mineral identification, map interpretation, astronomical observations
5. Exams (3-5 lecture exams, 3-5 lab exams); quizzes (5-15 lecture quizzes, 5-15 lab quizzes)

6. Class participation: in-class activities, discussions, group work, attendance

**Methods of Evaluation/Basis of Grade:**

**Writing:** Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

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| Essays, research papers and lab reports | Writing<br>15 - 30% |

**Problem Solving:** Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

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| Homework problems, lab activities | Problem solving<br>20 - 30% |

**Skill Demonstrations:** All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

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| None | Skill Demonstrations<br>0 - 0% |

**Exams:** All forms of formal testing, other than skill performance exams.

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| Objective questions, short answer and/or essay, lab exams | Exams<br>25 - 50% |

**Other:** Includes any assessment tools that do not logically fit into the above categories.

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|---|---|
| Class participation | Other Category<br>0 - 20% |

**Representative Textbooks and Materials:**
Earth Science. Tarbuck, Lutgens and Tasa (13th ed). Pearson, 2012.
Foundations of Earth Science. Lutgens, Tarbuck and Tasa (7th ed). Pearson, 2014.
The Good Earth: Introduction to Earth Science. McConnell, Steer, Owens and Knight (2nd ed). McGraw Hill, 2010.
Applications and Investigations in Earth Science. Tarbuck, Lutgens and Pinzke (7th ed). Pearson, 2012.