ES 131 Earth Science/Physical Geology Syllabus

Department of Physics and Earth Science

Faculty:

Phone and E-mail:

Office Hours:

Catalog Course Description: ES 131. (4) Earth Science/ Physical Geology. Basic principles governing the dynamic Earth including plate tectonics, volcanism, earthquakes, geologic time, rocks, minerals, weathering, and erosion. Three class periods; one 2-hour laboratory period per week. Field trips and/or projects may be required. Course fee $30.00. There are no prerequisites.

Required Text:


Required Lab Manual:


Area III: Natural Sciences and Mathematics

Statement of Purpose: The Natural Sciences and Mathematics requirement of the General Education Curricula addresses student comprehension of the logic and methods of scientific and mathematical analyses. The Natural Sciences component is designed for students to develop the capacity for working with data, to achieve a general understanding of the nature and methods of science, and to acquire a general knowledge of a specific discipline and the implications of such knowledge. The Mathematics component is designed for students to develop the capacity for mathematical thinking and to gain an understanding of its role in solving real-world problems.
Scope of the Course:

<table>
<thead>
<tr>
<th>Topic</th>
<th>Integrated Science Concepts &amp; Behaviors</th>
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<tbody>
<tr>
<td>Rocks and Minerals</td>
<td>components; thermal &amp; cooling effects; chemical bonding; molecular alignment; chemical formulas; chemical reactions; resources; optical properties including reflection and refraction of light; crystal development; specific gravity; cycles (rock, carbon); textures; evaporates; lithification;</td>
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<td>Plate Tectonics</td>
<td>Density; Thermal &amp; pressure impacts; magnetism; earthquakes—detecting and measuring; boundary formation; boundary types; intra –continental faults</td>
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<td>Volcanoes; Mountain Building; Earthquakes</td>
<td>Viscosity influences; collisional forces; energy wave behavior; heat; and temperature; parts of Earth; tsunami; gravitational equilibrium</td>
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<tr>
<td>Geologic Time</td>
<td>Laws and Principles of Relative Dating; Interpreting sedimentary layers; atomic structure &amp; radioactivity; half-life; changes; scale; continental formation</td>
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<tr>
<td>Fossils</td>
<td>Formation; preservation of life forms; Carbon 14 dating; radiometric dating; classification</td>
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<td>Influences of geology, the geosphere on the biosphere, hydrosphere; atmosphere; space</td>
<td>Environmental sustainability; quality of life; biotic and abiotic relationships; geochemical principles; populations; technology and data; sources and limits of resources astronomy related to the structure of the universe; energy flow on Earth and in space; technology for space explorations; measurement and classification of Earth materials</td>
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<td>290-3-3-.15(1)(c)1.(xiii)</td>
<td>Weathering and Erosion 290-3-3-.15(1)(c)1.(iii) 290-3-3-.15(1)(c)1.(vii)</td>
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<td>General Scientific Principles 290-3-3-.15(1)(c)1.(x) 290-3-3-.15(1)(c)1.(xii) 290-3-3-.15(1)(c)1.(xiv)</td>
<td>Determining credible resources; scientific methods; scientific method; nature of science; inter-relationships of spheres of Earth; application of science for environmental quality, personal, and community health; Scientists’ contributions to knowledge</td>
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**Learning Objectives: A Note**

*Many objectives reflect Earth Science Literacy Principles: Big Ideas and Supporting Concepts of Earth Science—American Association for the Advancement of Science Benchmarks for Science Literacy and the documentation for requirements for Secondary Science Education majors are identified by ALSDE—Alabama State Department of Education*

**Learning Objectives and Assessments**

Students will demonstrate an understanding of the fundamental concepts of Earth Science, particularly physical geology, the geo-sphere, and inter-relationships to the biosphere, hydrosphere, atmosphere, and space. At minimal, summative test question(s) will assess each learning objective. Other processes are provided.

Students will demonstrate the knowledge of:

1. Earth and space science including energy and geothermal cycles, climate, oceans, weather, natural resources, and changes in the Earth as they influence one another through the dynamic nature of Earth’s geosphere changes through geological, hydrological, physical, chemical, and biological processes that are explained by universal laws
   290-3-2-.15 (1)(a)2.(i); ALSDE;
   *Assessment of objectives will include a combination of the following: laboratory inquiries; panel discussions, class discussions, and/or tests.*
2. Earth science including geochemistry, cycles of matter, and energetics of Earth systems
290.3-3-.15 (1)(b)(ii) ALSDE;
Assessment of objectives will include a combination of the following: laboratory inquiries; panel discussions, class discussions, and/or tests.

3. characteristics of land, atmosphere, and ocean systems on Earth
290-3-3-.15(1)(c)(i) ALSDE;
Assessment of objectives will include a combination of the following: laboratory inquiries; panel discussions, class discussions, and/or tests.

4. properties, measurement, and classification of Earth materials
290-3-3-.15(1)(c)(ii) ALSDE;
Assessment of objectives will include a combination of the following: laboratory inquiries; panel discussions, class discussions, and/or tests.

5. geologic history as evidence of gradual and catastrophic change over time--including land formation, erosion, and plate tectonics
290-3-3-.15(1)(c)(iii) ALSDE;
Assessment of objectives will include a combination of the following: laboratory inquiries; panel discussions, class discussions, and/or tests.

6. geothermal cycles including biotic and abiotic systems
290-3-3-.15(1)(c)(iv) ALSDE;
Assessment of objectives will include a combination of the following: laboratory inquiries; panel discussions, class discussions, and/or tests.

7. energy flow and transformation in Earth and stellar systems
290-3-3-.15(1)(c)(v) ALSDE;
Assessment of objectives will include a combination of the following: laboratory inquiries; panel discussions, class discussions, and/or tests.

8. hydrological features of the Earth
290-3-3-.15(1)(c)(vi) ALSDE;
Assessment of objectives will include a combination of the following: laboratory inquiries; panel discussions, class discussions, and/or tests.
9. patterns and changes in the atmosphere, weather, and climate
290-3-3-.15(1)(c)1.(vii) ALSDE;
Assessment of objectives will include a combination of the following: laboratory inquiries; panel discussions, class discussions, and/or tests.

10. fundamental processes of investigation in the Earth and space sciences
290-3-3-.15(1)(c)1.(x) ALSDE;
Assessment of objectives will include a combination of the following: laboratory inquiries; panel discussions, class discussions, and/or tests.

11. sources and limits of natural resources-- resource formation, distribution, limitations, use, and sustainability issues
290-3-3.15 (1)(c)1.(xi) ALSDE;
Assessment of objectives will include a combination of the following: laboratory inquiries; panel discussions, class discussions, and/or tests.

12. application of Earth and space sciences to environmental quality and to personal and community health and welfare
290-3-3-.15(1)(c).(xii) ALSDE;
Assessment of objectives will include a combination of the following: laboratory inquiries; panel discussions, class discussions, and/or tests.

13. the role of technology in measuring data and communicating scientific ideas including challenges and required technologies for space exploration
290-3-3-.15(1)(c)1.(xiii) ALSDE;
Assessment of objectives will include a combination of the following: laboratory inquiries; panel discussions, class discussions, and/or tests.

14. Earth or space scientists and their contributions
290-3-3-.15 (1)(c)1.(xiv) ALSDE;
Assessment of objectives will include a combination of the following: laboratory inquiries; panel discussions, class discussions, and/or tests.

15. Earth Science or astronomy related to the structure of the universe, energy, and interactions of matter
290-3-3-.15(1)(d)2.(iii) ALSDE;
Assessment of objectives will include a combination of the following: laboratory inquiries; panel discussions, class discussions, and/or tests.
Learning Activities may include: field trip(s).
Accommodation Statement: In accordance with the American Disabilities Act (Ada) AND Section 504 of the Rehabilitation Act of 1973, the University offers reasonable accommodations to students with eligible documented learning, physical, and/or psychological disabilities. Under Title II of the Americans with Disabilities Act (ADA) of 1990 and Section 504 of the Rehabilitation Act of 1973, a disability is defined as a physical or mental impairment that substantially limits one or more major life activities as compared to an average person in the population. It is the responsibility of the student to contact Developmental Services prior to the beginning of the semester to initiate the accommodation process and to notify the instructor within the first three class meetings to develop an accommodation plan. Appropriate, reasonable accommodations will be made to allow each student to meet course requirements, but no fundamental or substantial alteration of academic standards will be made. Students needing assistance should contact Developmental Services.

Grading: 90-100%--A  80-89%--B  70--79% C  60-69%--D  < 60%--F
Lab=25% of Final Grade