

Syllabus

EARTH-101: EARTH SCIENCE FOR THE 21ST CENTURY

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Summary: Earth science encompasses the geology, chemistry, biology, and physics of our planet, while appreciating its beauty. Environmental degradation, natural resources, energy, climate change, and geologic hazards are among the most pressing issues facing 21st century society. This course introduces students to Earth science through topical lectures and discussion of current events and research.

Learning objectives:

- Understand latest theories about how the Earth and moon formed
- Study the composition and structure of the Earth
- Draw connections between plate tectonics, the rock cycle, climate, and geologic hazards
- Learn how oil formed and evaluate how much is left; natural gas and fracking
- Learn about nuclear energy technology and policy
- Weigh the relative merits of wind, solar, hydro, and geothermal energy
- Learn about mineral resources and rare earth elements (REE's)
- Explore the geology and history of our National Parks
- Learn about job and career opportunities in Earth science
- Develop listening comprehension skills (weekly quizzes based on lecture)
- Learn to write brief research reports using primary sources of information

Week 1: Building a habitable planet

Lecture 01: What do Earth scientists do?

Lecture 02: Age and formation of the Earth and moon

Week 2: Composition and structure of the Earth

Lecture 03: Composition and structure of the Earth

Lecture 04: Journey to the center of the Earth

Week 3: Earth materials and plate tectonics

Lecture 05: Earth materials and the evolution of minerals

Lecture 06: The rock cycle and plate tectonics

Week 4: Living on a dynamic planet

Lecture 07: Geologic hazards I (earthquakes and tsunamis)

Lecture 08: Geologic hazards II (volcanoes)

Week 5: Climate change, past and present

Lecture 09: Climate change: What are the rocks telling us?

Lecture 10: Hubbert's Peak: How much oil is left?

Week 6: Energy from the Earth

Lecture 11: Coal, natural gas, and fracking

Lecture 12: Nuclear energy, technology and policy

Week 7: The future of renewable energy

Lecture 13: Renewables I (solar and wind energy)

Lecture 14: Renewables II (hydro and geothermal energy)

Week 8: Special Topics

Lecture 15: Current research in Earth Science (TAs)

Lecture 16: Mineral resources and REEs: Can minerals save the planet?

Week 9: Special Topics

Lecture 17: Geology of the National Parks

Lecture 18: Jobs and careers in or related to Earth science

Week 10: Last Day (review) Lecture 19: Review Session