

Earth History: SCI 210

Jackson State University

Instructor Info:

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Text:

Stanley, S. M. 2004, Earth System History, Second Edition, W. h. Freeman and Company, 567 p.

Course Description:

This course covers major events that have shaped the Earth during the past 4.6 billion years. Physical, chemical, and biological characteristics of Precambrian, Paleozoic, Mesozoic, and Cenozoic intervals will be discussed. Important topics include evolution of continents, origin of mountain ranges, evolution of oceans, sea-level fluctuations, variation in seawater chemistry, evolution of atmospheric gases, and major deformation events. In the laboratory portion of the course students are familiarized with major fossil groups and geological maps.

Course Objectives:

The main objective of this course is to provide students with a comprehensive knowledge of the events that has influenced the Earth during the past 4.6 billion years.

Course Content:

Week 1

- 1/. The dynamic earth
 - The scope of Earth history
 - Earth materials
 - Earth's surface and interior
 - Rock cycle

2/. The history of the universe, solar system, and planets

- Origin and history of the solar system
- Meteorites: the extraterrestrial visitors
- Origin and differentiation of early Earth
- The origin of Earth – Moon system
- Terrestrial planets
- Jovian planets

Week 2

3/. Minerals and rocks

- Matter and its composition
- Bonding and compounds
- Mineral groups
- Rock forming minerals
- Igneous rocks
- Sedimentary rocks
- Metamorphic rocks

4/. Geological time

- Earth concepts of geological time
- Fundamental geological principles
- Uniformitarianism
- Absolute dating methods
- Fossils and history

Week 3

5/. Rocks, fossils, and time

- Lithostratigraphy and biostratigraphy
- Lateral relationships and facies
- Transgressions and regressions
- Fossilizations
- Type of preservation
- Fossils and time
- Quantifying the relative time scale

6/. Depositional Environments of sedimentary rocks

- Features of sedimentary rocks: lithology, structures, fossils
- Depositional environments
- Continental environments
- Transitional environments
- Deltas
- Environmental interpretations

Paleography and paleoclimate

Week 4

- 7/. Plate tectonics: a unifying theory
 - Wagener and continental drift
 - Paleomagnetism and polar wandering
 - Magnetic reversals and seafloor spreading
 - Plate boundaries
 - Hot spots and mantle plumes
 - Plate movements and motions
 - Plate tectonics and mountain building
 - Plate tectonics and distribution of natural resources

Week 5

- 8/. Precambrian history: the Archean Eon
 - Pre-Archean crustal evolution
 - Shields and cratons
 - Archean rocks
 - Development of Archean craton
 - Archean plate tectonics
 - Archean life
 - Archean mineral deposits

- 9/. Precambrian history: the Proterozoic
 - Proterozoic crustal evolution
 - Proterozoic supercontinent
 - Proterozoic rocks
 - The evolution of atmosphere
 - Proterozoic life
 - Multicellular organisms

Week 6

- 10/. Geology of the Early Paleozoic Era
 - Paleozoic paleogeography
 - Early Paleozoic evolution of North America
 - Tippecanoe Sequence
 - General characteristics of modern reefs
 - Silurian reefs
 - Appalachian mobile belt and Taconic Orogeny

Week 7

- 11/. Geology of the Late Paleozoic
- Late Paleozoic paleogeography
 - Devonian period
 - Carboniferous period
 - Permian Period
 - Paleozoic history of North America
 - The Kaskaskia Sequence
 - The Absaroka Sequence
 - Cyclothems
 - Devonian great barrier reefs
 - History of the Late Paleozoic mobile belts
 - Cordilleran mobile belt
 - Ouachita mobile belt
 - Appalachian mobile belt
 - Formation of Pangaea

Week 8: Mid-Term Exam

Week 9

- 12/. Life of the Paleozoic Era: Invertebrate
- First shelled fossils
 - Cambrian period and the emergence of shelly fauna
 - Acquisition of hard parts
 - Paleozoic invertebrate marine life
 - Cambrian marine community
 - The Burgess Shale biota
 - Ordovician marine community
 - Carboniferous and Permian
 - End Permian mass extinction

Week 10

- 13/. Life of the Paleozoic Era: Vertebrates and Plants
- Amphibians – vertebrates invade land
 - Reptiles
 - Plants
 - Silurian and Devonian floras
- 14/. Geology of the Mesozoic Era
- The breakup of Pangaea
 - Global climate and ocean circulation
 - Continental interior

The U.S. Gulf Coast region
Western region of North America
Jurassic and Cretaceous tectonics

Week 11

- 15/. Life of the Mesozoic Era
Marine invertebrate
Fish and amphibians
Primary producers on land
Reptiles
Birds
Mesozoic mammals
End Mesozoic mass extinction

Week 12

- 16/. Cenozoic Geologic History: Tertiary Period
Cenozoic plate tectonics
Cenozoic orogenic belts
Alpine – Himalayan orogenic belt
The Rockies
Laramide orogeny
Basin and Range of Western United States
The Colorado Plateau
Interior low lands
The U.S. Gulf Coastal plain
Eastern North America

Week 13

- 17/. Cenozoic Geologic History: Quaternary Period
The onset of ice ages
Pleistocene paleogeography and climate
Pleistocene and Holocene geological history
The effects of glaciation
Causes of Pleistocene glaciation

Week 14

- 18/. Life of the Cenozoic Era
Marine invertebrates
Cenozoic birds
Placental mammals

Mammals of the Pleistocene
Pleistocene mass extinction
Cenozoic vegetation and climate

19/. Evolution of the Primates and Humans

Primates
Anthropoids
Hominids

Week 15: Class Presentations

Week 16: Final Exam

Student Evaluation:

Mid-term exam	40%
Final Exam	40%
Research paper	10%
Presentation	10%
	Total = 100%

Grading Scale

A = 90 - 100

B = 80 - 89

C = 70 - 79

D = 60 - 69

F <60