

College of San Mateo
Official Course Outline

1. **COURSE ID:** PALN 110 **TITLE:** General Paleontology **C-ID:** GEOL 110
Units: 3.0 units **Hours/Semester:** 48.0-54.0 Lecture hours; and 96.0-108.0 Homework hours
Method of Grading: Letter Grade Only

2. **COURSE DESIGNATION:**

Degree Credit

Transfer credit: CSU; UC

AA/AS Degree Requirements:

CSM - GENERAL EDUCATION REQUIREMENTS: E5a. Natural Science

CSU GE:

CSU GE Area B: SCIENTIFIC INQUIRY AND QUANTITATIVE REASONING: B1 - Physical Science

CSU GE Area B: SCIENTIFIC INQUIRY AND QUANTITATIVE REASONING: B2 - Life Science

IGETC:

IGETC Area 5: PHYSICAL AND BIOLOGICAL SCIENCES: A: Physical Science

IGETC Area 5: PHYSICAL AND BIOLOGICAL SCIENCES: B: Biological Science

3. **COURSE DESCRIPTIONS:**

Catalog Description:

The origin and evolution of the planet and life on earth through the past 4.6 billion years. Includes the study of fossils, rocks, geologic time, dating methods, evolution by natural selection, modern and ancient ecosystems, plate tectonics, speciation and mass extinction.

4. **STUDENT LEARNING OUTCOME(S) (SLO'S):**

Upon successful completion of this course, a student will meet the following outcomes:

1. Demonstrate an understanding of the nature of scientific knowledge and distinguish between true science and pseudoscience.
2. Demonstrate an understanding of the following concepts and principles: a. geologic time and dating methods b. evolution, extinction and speciation c. minerals and rocks d. plate tectonics e. fossilization f. ecosystems g. paleogeography and paleoclimate
3. Effectively describe multiple lines of evidence that support the theory of evolution by natural selection, plate tectonics theory or the immensity of geologic time.
4. Solve quantitative problems associated with geologic, biologic or paleontologic concepts
5. Interpret graphical representations associated with geologic, biologic or paleontologic concepts
6. Explain the tectonic processes that shape the Earth and their influence on the environment, ecosystems and evolution
7. Draw appropriate conclusions from the application of scientific principles in interpretation of fossils, minerals, rocks and geologic cross sections

5. **SPECIFIC INSTRUCTIONAL OBJECTIVES:**

Upon successful completion of this course, a student will be able to:

1. Demonstrate an understanding of the nature of scientific knowledge and distinguish between true science and pseudoscience
2. Demonstrate an understanding of the following concepts and principles: a. geologic time and dating methods b. evolution, extinction and speciation c. minerals and rocks d. plate tectonics e. fossilization f. ecosystems g. paleogeography and paleoclimate
3. Effectively describe multiple lines of evidence that support the theory of evolution by natural selection, plate tectonics theory or the immensity of geologic time
4. Solve quantitative problems associated with geologic, biologic or paleontologic concepts
5. Interpret graphical representations associated with geologic, biologic or paleontologic concepts
6. Explain the tectonic processes that shape the Earth and their influence on the environment, ecosystems and evolution
7. Draw appropriate conclusions from the application of scientific principles in the interpretation of fossils, minerals, rocks and geologic cross sections

6. **COURSE CONTENT:**

Lecture Content:

- A. Introduction
 - Defining Science
 - Eclectic Nature Of Paleontology
 - History Of Paleontology
- B. Geologic Time And Dating
 - Geologic Time Scale
 - Relative And Absolute Dating
- C. Minerals, Igneous & Metamorphic Rocks
 - Formation And Interpretation
- D. Sedimentary Rocks
 - Formation
 - Interpretation Of Sedimentary Structures And Depositional Environments
 - Stratigraphy, Facies & Correlation
- E. Fossils
 - Preservation
 - Fossils As Clues To Environments
 - Dating With Fossils
- F. Evolution
 - Lamarck, Darwin And Wallace
 - Natural Selection And Genetics
 - Evidence Of Evolution
 - Speciation & Extinction
 - Mechanisms, Patterns And Rates Of Evolution
- G. Organization Of Life
 - Taxonomy
 - Phylogeny
 - Cladistics And Cladogram Construction
- H. Ecosystems & Paleoclimate
 - Terminology
 - Ecosystem Interactions
 - Paleoclimate Indicators
- I. Plate Tectonics
 - Earth Structure
 - Plate Tectonics Basics
 - Effects On Paleoclimate
- J. Origin Of The Earth And Life On Earth
 - Nebular Theory
 - Early Atmosphere
 - Amino Acids
- K. Precambrian Geology And Life
 - Archean Terranes
 - Proterozoic Supercontinents
 - Prokaryote To Eukaryotes To Multicellular Life
 - Ediacaran Fauna
- L. Paleozoic Geology & Life
 - Orogenies And Paleogeography
 - Cambrian Explosion
 - Cheng Jiang & Burgess Shale Fossils
 - Marine Invertebrates
 - Fish, Amphibians And Reptiles
 - Land Plants: Psilophytes, Gymnosperms
 - Permian Extinction
- M. Mesozoic Geology & Life
 - Orogenies And Paleogeography
 - Dinosaurs
 - Marine Reptiles
 - Flying Reptiles
 - Early Mammals
 - Birds
 - Flowering Plants
 - K./T Extinction
- N. Cenozoic Geology & Life
 - Orogenies And Paleogeography
 - Mammal Radiation
 - Primates & Hominids
 - Ice Age Mammals
 - Pleistocene Extinction

7. REPRESENTATIVE METHODS OF INSTRUCTION:

Typical methods of instruction may include:

- A. Lecture
- B. Activity
- C. Discussion
- D. Observation and Demonstration
- E. Other (Specify): The following methodologies are appropriate. Individual faculty will use whatever mix of these they find most effective in the presentation of each topic. a. Lecture presentation supplemented by

demonstrations, visuals and/or rocks or fossils b. Instructor-led class discussions c. Hands-on work with fossils and/or rocks to illustrate features and/or differences d. In-class exercises to practice identification, interpretation or application of new skills/knowledge using fossils, rocks, models or simulated situations.

8. REPRESENTATIVE ASSIGNMENTS

Representative assignments in this course may include, but are not limited to the following:

Writing Assignments:

Representative examples of writing assignments:

How do the supporters of "Intelligent Design Theory" differ from scientists in their views on the evolution of complex organs or structures such as the human eye?

Give a brief description of Paleozoic fish evolution that includes at least 5 of the key adaptations and the advantages gained from those adaptations. Be careful to avoid Lamarckian phrasing that implies goal-oriented evolution (fish evolved jaws so that they could bite).

Reading Assignments:

Reading assignments include chapters from the textbook and other sources posted in the LMS class site as stated on the class schedule.

Other Outside Assignments:

Students are required to do independent research to prepare oral presentations about extinct organisms.

9. REPRESENTATIVE METHODS OF EVALUATION

Representative methods of evaluation may include:

- A. Class Work
- B. Exams/Tests
- C. Homework
- D. Projects
- E. Written examination
- F. Instructors have considerable discretion in determining course grades, but the department expects in-class tests to account for approximately 80% of the final grade. Projects, homework and in-class assignments typically combine to account for the remaining 20% of the grade.

10. REPRESENTATIVE TEXT(S):

Possible textbooks include:

- A. Harold Levin. *The Earth Through Time*, 11th ed. John Wiley & Sons, 2016

Origination Date: August 2020

Curriculum Committee Approval Date: October 2020

Effective Term: Fall 2021

Course Originator: Linda Hand