

**NOVA COLLEGE-WIDE COURSE CONTENT SUMMARY
GOL 206 – PALEONTOLOGY (4 CR.)**

Course Description

Surveys major groups of fossil invertebrates and vertebrates. Covers form, function, ecology, and evolution for each group in the context of geologic time. Lecture 3 hours. Laboratory 3 hours. Total 6 hours per week.

General Course Purpose

The course purpose is to present to students of geology the types of common fossils, the processes and materials typical of fossilization, and the relationships between contemporaneous prehistoric organisms, set in the context of the co-evolution of life and Earth's surface. This course is intended as an advanced geology course comparable to paleontology courses in other universities.

Course Prerequisites/Co-requisites

The student is expected to have completed GOL 106 or permission of instructor.

Course Objectives

Upon completion of the Paleontology course, the student will be able to:

- identify and classify a spectrum of commonly encountered fossils
- describe the anatomy of several groups of living and extinct organisms
- recognize the materials in common fossils
- distinguish common and unusual mechanisms of organism preservation
- outline the major steps in evolution of organisms through geologic time
- discuss and explain the processes of natural selection and mutation
- predict fossil content of a region based on surface rock age and type
- compare and contrast methods of biological classification
- detail major extinction events and the theories invoked to explain them

Major Topics to be Included

A) Organisms Covered

1. Invertebrates
 - microbes
 - annelids
 - cnidarians
 - arthropods—trilobites, crustaceans, arachnids, insects
 - molluscs—bivalves, gastropods, ammonites, cephalopods
 - lophophorates—brachiopods, bryozoans
 - echinoderms
2. Vertebrates
 - hemichordates
 - fish—placoderms, osteichthyes, chondrichthyes
 - amphibians
 - sauropsids—anapsids, synapsids, diapsids
 - archosaurs—crocodilians, pterosaurs, dinosaurs, birds
 - mammals—monotremes, marsupials, placentals
 - hominids

3. Plants
 - algae
 - bryophytes
 - gymnosperms
 - angiosperms
 - grasses
4. Fungus

B) Description Per Organism (listed in A)

1. Anatomy
 - morphology
 - ontogeny and growth
 - ecology
2. Classification
 - species definition and problems for paleontology
 - binomial nomenclature and position of taxa in biological hierarchy
 - evolutionary relationship to higher orders
3. Taphonomy
 - typical fossils and preservation
4. Evolution and Extinction
 - interpretation of fossil evidence
 - position in geologic time
 - events during biochronological range

C) Paleontological Theory

1. Processes of Evolution
 - populations, resources, and competition
 - stress and response—natural selection
 - genetic inheritance—mutation
 - the role of luck
 - the role of geology—vicariance
 - causes of extinction
2. Processes of Fossilization
 - favorable conditions for fossilization
 - mechanisms—permineralization, replacement, etc.
 - duration and results
3. Characteristics of the Fossil Record
 - diversity
 - bias
 - preservation of populations
 - preservation of ecosystems and communities
 - fossil assemblages
4. Techniques of Paleontological Analysis
 - morphological analysis
 - phyletic trends
 - numerical taxonomy and cladistics
 - biostratigraphy