

**CENTRAL UNIVERSITY OF KERALA
DEPARTMENT OF GEOLOGY
M.Sc. GEOLOGY**

Course Code	EGE 5204	Semester	II
Course Title	Paleontology		
Credits	3	Type	Core

This is a participatory, experimental, problem solving and employability based Field geology skill development course.

Course Description

Paleontology is the scientific study of life that existed in the geological past. It includes the study of fossils to classify organisms and study their interactions with each other and their environment. The course aim to observe and examine the anatomy, morphology, and evolutionary history of vertebrate and invertebrate organisms and plants, understand the major lineages of organismal life through study of their anatomy and diversity, describe the major events (extinctions, diversifications, and environmental transitions) in the history of life and relate these events to possible causes.

Course Outcome

By the end of the course, students are expected to be able to:

- To understand palaeontological principles, terms, definitions and classifications, the applications of fossils in understanding Earth history.
- Recognize and identify invertebrate fossils, label key anatomical features and explain their function, recognize and classify fossil plants and animal traces, understand general characteristics and evolution of vertebrates.
- Application of fossils to constrain the age of the enclosing rock, identify and describe the principal microfossil groups, describe the methods of sample collection and laboratory preparation of microfossils.
- Summarise the value of microfossils in paleoenvironmental reconstruction, assess the importance of microfossils in hydrocarbon sub-surface exploration.
- Students will master complex and specialized knowledge, concepts and ideas in palaeontology which includes identification and description of vertebrate, invertebrate, plant and micro fossils. To develop research capability and practical competency in the field of palaeontology.

Course Structure

Module - 1

Life during the Precambrian, Diversification of life. Evolution of life during the Palaeozoic, Mesozoic and Cenozoic eras. Cambrian explosion. Fossil record and modes of evolution: Microevolution, Macroevolution and Tree of life. Theory of organic evolution and the factors in the Darwinian theory. Theory of Punctuated Equilibria. Origin of life: extra-terrestrial and terrestrial. Miller's experiment. Mass extinction and its causes.

Module - 2

General characteristics, geologic history, classification and evolution of Pisces, Amphibians, Reptiles, Birds and Mammals (Elephant, Horse and Human being). Human fossils from different parts of the world. Use of fossils in palaeoclimatic, paleoecological and palaeogeographic studies. Major fossil discoveries from India

Module - 3

Micropalaeontology: scope and subdivisions - types, extraction of microfossils from sediments and sedimentary rocks. Foraminifera: their palaeoecology and application in paleoclimate, paleoceanography and biostratigraphy. Radiolaria, Diatoms, Ostracoda, Pteropods, Coccolithophores, Stromatolites and Conodonts – morphology, classification and importance. Palynology: General morphology of spores and pollen and their applications. Palaeobotany: Plant life through geological ages. Gondwana plant fossils. Application of microfossils in petroleum exploration.

Evaluation & Grading

Lab Assessment – 10%

Skill development (Analytical, Writing and Presentation) – 10%

Class Test – 20%

End Semester Assessment – 60%

References

- Benton, J.M. and Harper (2009) Introduction to palaeobiology and the fossil record, Wiley-Blackwell, 608p.
- Benton, M.J (2000). Vertebrate Palaeontology, Blackwell Science, 269p.
- Black, R.M (1989) The elements of palaeontology, Cambridge University Press, 420p
- Brasier. M.D (1980) Microfossils, George Allen and Unwin Ltd, 193p.
- Clarkson, E.N.K (1998). Invertebrate Palaeontology and Evolution, ELBS Publishers. 468p.
- Glaessner, M.F. Principles of Micropalaeontology, Hafner Publishing Company, 296p.
- Lehmann, U and Hilmer, G (1983) Fossil Invertebrates, Cambridge University, 350p
- Porthero, D.R. (2004) Bringing fossil to life- An Introduction to Paleontology Mc Graw Hill, 512p.
- Pough, H. F, Heiser, J.B. and McFarland, W.N. (1996). Vertebrate Life, Prentice hall, 720p.
- Raup D.M. and Stanley .S (1985) Principles of Palaeontology, 481p.
- Ray, A.K (2008). Fossils in earth Sciences, Prentice Hall of India Private Limited, 444p.
- Shrock, R.R., Twenhofel, W.H (1953). Principles of Invertebrate Palaeontology, Mc Graw Hill, 816p.