

Course Outline

Course Type	Course Code	Name of Course	L	T	P	Credit
DC	NGLC514	Micropaleontology and Vertebrate Palaeontology	3	0	0	3

Course Objective

The primary objective of the course is to introduce students to kinds of microfossils, their separation, identification, and uses. This course is designed so that students can use their knowledge for exploration, paleoclimate, paleoceanography, and paleogeographic study.

Learning Outcomes

Upon successful completion of this course, students will:

- Gaining knowledge about the groups of microfossils
- How these groups can be helpful for fossil fuel exploration
- Understanding paleoclimatic, paleoceanographic, and paleogeographic variations through micropaleontology
- The case study will be more helpful for the student to understand the objectives.

Unit No.	Topics to be Covered	Lecture Hours	Learning Outcome
1	Introduction to various groups of microfossils with their general stratigraphic distribution. Sampling and separation techniques of microfossils from different types of sedimentary rocks. The international coding system of core samples	5	A brief idea about groups of microfossils, their separation, and coring procedures.
2	Morphology and Ecology of Foraminifera, Ostracod, and Nannoplankton	5	Morphologic descriptions of microfossil groups will help to identify up to the genus or species level.
3	Application of micropaleontology in fossil fuel exploration and paleoclimate: Biostratigraphy, productivity index, aeration in marine water, paleodepth, and marine transgression & regression, paleolatitude, bacterial degradation of organic carbon, sedimentation rate.	11	This part considered applications of microfossils in terms of paleoceanography, paleoecology and paleogeography, biostratigraphy, and fossil fuel exploration.
4	Stable isotopes of microfossils. Use of microfossils: case studies	5	Use of $\delta^{13}\text{C}$ and $\delta^{18}\text{O}$ for paleoclimatic and hydrocarbon exploration.
5	Origin of vertebrates and their general evolutionary patterns, Classification and characteristic features of vertebrates (Agnathans, Fishes, Amphibia, Reptilia, Aves, and Mammalia), General skeletal pattern with its different components in vertebrates	5	This part deals with a general description of vertebrate groups.
6	Dentition patterns, variation in molar teeth and their implication	3	Students will learn different dentition patterns, related food habits, and stratigraphic use of dentition patterns.
7	Adaptation, evolution, and phylogeny of Equids, Proboscidea, and Hominids	6	Knowledge will be imparted with respect to the adaptation and evaluation of horses, elephants, and man.
8	Dinosaurs and their extinction.	2	A brief description of a dinosaur and how it disappeared from the earth.
	Total Classes	42	

Text Books:

- Saraswati, P. K., and Srinivasan, M. S. (2016). Micropaleontology: Principles and Applications. Fourth edition: Springer, Switzerland pp. 1-223.
- Armstrong, H., and Brasier, M., (2005). Microfossils (2nd Edition). Blackwell Publishing, USA, pp. 1-296.
- Benton, J. G., (2015). Vertebrate Palaeontology (4th Edition), Wiley Blackwell, UK, pp. 1-453.

Reference Books:

- Haq, B. U., and Boersma, A., (1998). Introduction to marine micropaleontology (2nd Edition). Elsevier, Amsterdam, pp. 376.
- Carroll, R. L., 1988. Vertebrate Paleontology and Evolution. WH Freeman, pp. 698.
- Romer, A., Vertebrate paleontology (3rd Edition). University of Chicago Press, pp. 687.