# Department of Applied Zoology MSc Zoology

**ZOH401: ANIMAL TAXONOMY AND EVOLUTION Teaching Hours 10/Unit** 

## **COURSE OUTCOME**

- 1. Taxonomy paper uses the lessons specifically designed to achieve student understanding of biosystematics and to move quickly beyond the knowledge level to high-level thinking.
- 2. Through this paper, aspirants are trained to utilize different taxonomic tools like identification keys to identify different groups of organisms.
- 3. To know and understand the seven levels of classification and apply this knowledge to classify animals from the Kingdom to Species level.
- 4. They learn to evaluate biodiversity indices through usage of software.
- 5. They obtain an academic speciality besides evolutionary trends, species and characteristics, significance of evolution
- 6. This course inculcates in students, skills required for an animal taxonomist.

#### **UNIT I**

Definition and basic concepts of biosystematics taxonomy and classification. History of Classification – Linnaeus to new systematic. Higher order taxonomy – Aristotle to Whittaker's five kingdom and Carl Woese's six kingdom and three domains. Trends in biosystematics: Chemotaxonomy, Cytotaxonomy and Molecular taxonomy. Hierarchy of categories- Taxonomic ranks.

## UNITII

Dimensions of speciation and taxonomic characters. Taxonomic procedures: Taxonomic collections, preservation, curetting, process of identification. Taxonomic keys, different types of keys, their merits and demerits. International code of Zoological Nomenclature (ICZN):Operative principles, interpretation and application of important rules. Major classes of taxonomy (Phenetics, Cladistics and Phylogenetics).

## UNIT III

Evaluation of biodiversity indices. Evaluation of Shannon - Weiner Index, Simpson's index. Evaluation of Dominance Index. Similarity and Dissimilarity Index. Data collection methods, GPS, GIS and mapping

#### **UNIT IV**

Concepts of evolution and theories of organic evolution. Neo Darwinism and population genetics: Hardy-Weinberg law of genetic equilibrium. Detailed account of destabilizing

forces: Natural selection, Mutation, Genetic Drift, Migration, Meiotic Drive. Trends in Evolution. Molecular Evolution- Gene evolution, Evolution of gene families, Assessment of molecular variation

## **UNITV**

Species concepts: different types. Modes of speciation (Allopatric, Peripatric, Parapatric and Sympatric speciation). Origin and mechanisms of reproductive isolation. Patterns of speciation: gradualism and punctuated equilibrium. Major trends in the origin of higher categories. Micro and macro evolution. Molecular population genetics- Pattern of changes in nucleotide and amino acid sequence. Ecological significance of molecular variations (genetic polymorphism). Origin and Evolution of Economically important microbes and animals.

#### REFERENCES

- 1. Batschelet, E. (1975) Introduction to Mathematics for Life Scientists,2nd edition, Springer-Verlag, Berlin-Heidelberg-New York
- 2. Koto, M. (2000) The Biology of biodiversity, 1<sup>st</sup> edition, Springer, Japan.
- 3. Murry J.D. (1993) Mathematical Biology, 2<sup>nd</sup> edition, Springer-Verlag, New York/Berlin.
- 4. Simpson, G.G. (1961) Principle of animal taxonomy, Columbia University Press, New York.
- 5. Snecdor, G.W. and Cocharan W.G. (1989) Statistical Methods, Affiliated-East-West Press, New Delhi.
- 6. Sokal, R.R. and RohlfF. J.(1995) Biometry the principles and practice of statistics in biological research, 3rd edition, New York W.H. Freeman.
- 7. Wilson, E.O. (1988) Biodiversity, National Academy Press, Washington, D.C.