ZOH401: ANIMAL TAXONOMY AND EVOLUTION

Teaching Hours 10/Unit

COURSE OUTCOMES

1. Taxonomy course 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 course, 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, 1st edition, Springer, Japan.
3. Murry J.D. (1993) Mathematical Biology, 2nd 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 Rohlf F. 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.