**Institute of Zoology**
**Faculty of Life sciences**
**University of the Punjab, Lahore**
**Course Outline**

| **Programme** | BS Zoology | **Course Code** | **ZOOL-404** | **Credit Hours** | 2 |
|---|---|---|---|---|---|
| **Course Title** | **Principles of Systematics** | | | | |

**Course Introduction**

Systematics is the exciting and ever-changing discipline which treats the kinds and the diversity of organisms and of any and all relationships which exist among them. This course will provide a comprehensive survey of the theory and methodology of systematics as they are applied today to all groups of organisms. The course is directed at those students interested in studies of evolutionary biology, biodiversity, conservation biology, and/or systematics. Some of the topics that will be considered include: species concepts and mechanisms of speciation, the major contemporary schools of taxonomy, methodologies of phylogeny estimation, the systematic significance of patterns of geographical distribution, considerations of molecular evolution as applied to systematic studies, the formation and use of research collections and nomenclature.

**Learning Outcomes**

On the completion of the course, the students will:

1. Understand the fundamental principles and methods of systematic biology including taxonomy, phylogenetics and biogeography
2. Identify and classify organisms using morphological, anatomical, molecular, behavioral and other characteristics.
3. Analyze and interpret phylogentic trees and cladogram.
4. Develop critical thinking skill to understand evolutionary relationships and biodiversity.
5. Communicate systematic concept and research .findings effectively through written and oral presentation.

| **Course Content** | | **Assignments/Readings** |
|---|---|---|
| **Week 1** | Introduction to sytematics | |
| | Contribution of systematic to Biology | |
| **Week 2** | Concepts of taxon, phenon and category | |
| | Concepts of category | |
| **Week 3** | Species concepts: Typological and Nominalistics | |
| | Species concepts : Biological, | |
| **Week 4** | Species concepts: Evolutionary | Paper on different concepts of species |
| | Species concepts: Mate recognition, Cohesion | |
| **Week 5** | Subspecies concept and their problems | |
| | Clines and hybrid zones, Polytypic species, Superspecies | |
| **Week 6** | Modes of speciation | |
| | Intrapopulation variation | |
| **Week 7** | Intrapopulation variation (Continued) | |
| | Intrapopulation variation (Continued) | |
| **Week 8** | Different kinds of taxonomic characters | |
| | Different kinds of taxonomic characters (continued) | |

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| **Week 9** | Weightage of taxonomic characters | |
| | Weightage of taxonomic characters (continued) | |
| **Week 10** | Classification and its types | Variations in characters used for classifications |
| | Phenetics classification | |
| **Week 11** | Phenetics classification (continued) | |
| | Cladistics classification | |
| **Week 12** | evolutionary classification | |
| | Difference between types of classification | |
| **Week 13** | Taxonomic collections and the process of identification | |
| | Taxonomic collections and the process of identification (continued) | |
| **Week 14** | Types of taxonomic publications | |
| | major features of taxonomic articles | |
| **Week 15** | The rules of zoological nomenclature (interpretation) | |
| | application of the codes (stability, priority, first reviser principle) | |
| **Week 16** | Range of authority of code; concept of availability and validity of names | |
| | Type method, synonym, homonym | |

**Textbooks and Reading Material**

1. Textbooks.
   Mayer, E. , Ashlock, P.D. (1994). Principles of systematic zoology. New York: McGraw-Hil
2. Suggested Readings
   i. Simpson, G. G. (2012). Principles of Animal Taxonomy. Columbia University Press.
   ii. Wiley, E. O. (2011). Phylogenetics: theory and practice of phylogenetic systematics. New Jersey: Wiley-Blackwell. 4.
   iii. Heywood, V. H. (1975). Taxonomy and ecology. London: Academic Press.

**Teaching Learning Strategies**

Lecture, Discussion

**Assignments: Types and Number with Calendar**

1. Four written assignments, 5 marks each

**Assessment**

| Sr. No. | Elements | Weightage | Details |
|---|---|---|---|
| 1. | Midterm Assessment | 35% | Written Assessment at the mid-point of the semester. |
| 2. | Formative Assessment | 25% | Continuous assessment includes: Classroom participation, assignments, presentations, viva voce, attitude and behavior, |
| 3. | Final Assessment | 40% | Written Examination at the end of the semester. |