

## **SEMESTER-I**

### **ZOOL C 401: Taxon, Phylogeny and Evolutionary Biology**

**Total marks: 80 + 20 = 100**

**Credit=04**

**End semester examination=80**

**Internal assessment=20**

#### **UNIT 1:**

Concept of Systematics and Taxonomy; Importance and application of Taxonomy; Modern trends in systematic; Taxonomic characters – morphological, ecological, ethological, geographical, biochemical and molecular characters; Characters with high and low taxonomic weight; Theories of classification.

#### **UNIT 2**

Species concept- Typological, Biological and Evolutionary species concept; Merits and difficulties in applying biological species concept; Subspecies, Race, Cline, Inceptient species; Principles of Zoological Nomenclature; International code for Zoological Nomenclature

#### **UNIT 3**

Origin of life: Concept of prebiotic environment; Neo-Lamarckian and Neo-Darwinian theory of evolution; Forces of evolution – mutation, selection, random genetic drift and migration; Speciation: Mode of speciation and factors responsible for speciation; Hardy-Weinberg law.

#### **UNIT 4**

Genetic polymorphism (DNA) and natural selection, selection coefficient; C-value paradox and Genomic evolution; Evolutionary history of proteins and nucleic acids; Concept of molecular clock; Molecular phylogenetics

## **SEMESTER-I**

### **ZOOL C-404 Genetics & Developmental Biology**

**Total marks: 80 + 20 = 100**

**End semester examination=80**

**Credit=04**

**Internal assessment=20**

#### **Unit 1**

Ovulation, Oocyte maturation, formation of germinal vesicle and polar bodies  
Spermatogenesis, structure of sperm; Sperm acrosome reaction and fertilization;  
establishment of diploidy, zygote formation  
Nucleocytoplasmic interaction during zygote formation

#### **Unit 2**

Cleavage pattern and fate map; formation of morulla and blastula  
Gastrulation , formation of three germinal layers.  
Viviparity in mammals; development of extraembryonic membrane and formation of  
placenta in mammalian embryo; structure and types of placenta and its function  
Organogenesis in mammal : development of eye and heart

#### **Unit 3**

Mandelian Laws: Gene interaction; Extension of Mendelism -Dominance relationship,  
epistasis, pleiotropy. Expressivity and penetrance.  
Sex determination and Sex linked inheritance;  
Studies on metaphase chromosomes; linkage, crossing over and recombination  
Multiple allelism, pseudoallelism, polygenic inheritance/ interaction  
Extranuclear inheritance; mutations in mitochondrial DNA

#### **Unit 4**

Numerical & structural Changes in chromosomes (aneuploidy, euploidy, auto and allo  
polyploidy) ; chromosome anomalies & diseases;  
Human genome project : History, Organisation, Goal & characterization of chromosomes  
Drosophila embryogenesis & development; Zygotic genes and segment formation in  
drosophila  
Development of Caerhabditis elegans : genetic analysis of vulva formation