

BIDAR UNIVERSITY BIDAR

ZOOLOGY V SEMESTER

DSC-5 (THEORY): Developmental Biology, Genetics and Evolution

Course Duration: 60 Hours

Credits: 04

Unit I: Developmental Biology

22 Hours

- **Gametogenesis:** Spermatogenesis and Oogenesis in mammals.
- **Eggs:** Types of eggs based on quantity and distribution of yolk with examples.
- **Fertilization:** External (Amphibians) & Internal (Mammals), Monospermy & Polyspermy, Significance of fertilization.
- **Early Development:** Cleavage, Morula, Blastula, Gastrula & Neurula.
- **Morphogenetic Movements & Germ Layers:** Fate of germ layers (Frog embryo).
- **Development of Chick:** Structure of hen's egg, origin & development of primitive streak (18 hrs & 24 hrs).
- **Extra-Embryonic Membranes:** Structure & functions of amnion, chorion, yolk sac, and allantois.
- **Human Development:** Structure of mature spermatozoan, Menstrual cycle, Graafian follicle, ovulation, fertilization, blastocyst, implantation.
- **Placenta:** Histological and morphological classification with examples; Placental hormones.
- **Organogenesis:** Outline derivatives of different germ layers.

Unit II: Genetics

22 Hours

- **Introduction:** Definition, history of genetics, branches of genetics, heredity and variation.
- **Mendelian Genetics and Its Extension:** Principles of inheritance (Monohybrid, Dihybrid, and Laws of inheritance), Incomplete dominance, and Co-dominance.
- **Interaction of Genes:**
 - **Supplementary factors (9:3:3:1)** e.g., Comb pattern in fowls.
 - **Complementary factors (9:7)** - e.g., Flower colour in sweet peas.
 - **Dominant Epistasis (12:3:1)** - e.g., Plumage colour in Leghorn and Wyandotte.
 - **Recessive Epistasis (9:3:4)** - e.g., Coat colour in pigs.
- **Multiple Alleles:** ABO blood groups in human, Rh-factor, and Lethal alleles.
- **Sex Determination:** Chromosomal mechanism of sex determination, Genic balance theory, Klinefelter's and Turner's syndromes, Sex-linked inheritance in man (Haemophilia, Colour blindness), Gynandromorphs & Intersex, and Y-linked genes.
- **Mutations:** Chromosomal mutations and Gene mutation.
- **Linkage & Crossing-Over:** Theories of linkage and crossing over.
- **Human Genetics:** Common human genetic disorders in man, Inborn errors of metabolism (Albinism, Phenylketonuria, Alkaptonuria, Sickle cell anemia, Thalassemia), and Eugenics.

Unit III: Evolution

16 Hours

- **Evolutionary Theories:** Lamarckism, Darwinism, and Neo-Darwinism.
- **Species Concept & Organic Evolution:** Concept of organic evolution.
- **Evidences for Organic Evolution:**
 - **Indirect Evidences:** Comparative morphology, anatomy, connecting links (Peripatus, Neoceratodus, Archaeopteryx), Homology, Analogy, Vestigial organs (Human).
 - **Direct Evidences:** Paleontology - Nature & types of fossils; Brief account of Dinosaurs.
- **Macro-evolutionary Principles:** Adaptive radiation (e.g., Darwin's Finches).
- Hardy-Weinberg Law.
- Evolutionary History of Man.