

Course Code	Course Title	C	H	I	E	T
17U5ZME1	Developmental Biology and Evolution	6	5	25	75	100

Objectives

- ❖ To learn the Concepts and study techniques of Developmental biology.
- ❖ To study History of evolutionary concepts and evidences for evolution.
- ❖ To get an exposure on human evolution.

Learning Outcome

1. Acquire knowledge on embryonic development, regeneration and aging.
2. Exploring evolutionary concepts

Unit – I (Introduction)

Phases of development, Cell – cell interaction, pattern formation, differentiation and growth, differential gene expression, cytoplasmic determinants and asymmetric cell division.

Unit – II (Embryonic development)

Gametogenesis, Spermatogenesis, oogenesis; Types of eggs, fertilization (external and internal), Parthenogenesis, Planes and patterns of cleavage; types of blastula; Fate maps; Embryonic induction and organizers (Spemann's experiment). Metamorphosis: Changes, hormonal regulation in amphibians and insects; Regeneration, Homeotic genes, Aging and teratogenesis.

Unit – III

Historical review of evolutionary concept: Lamarckism, Darwinism, Neo Darwinism; Evidences of evolution: Fossil records – transitional forms, geological time scale, Molecular basis of evolution – Universality of genetic code and protein synthetic machinery, neutral theory of molecular evolution, molecular clock.

Unit – IV

Natural selection, sources of variation: heritable variations and their role in evolution; product of evolution – species concept, isolating mechanisms; modes of speciation – allopatric, sympatric, adaptive radiation. Darwin finches.

Unit – V

Origin and evolution of man, important hominid fossils, primate phylogeny from *Dryopithecus* leading to *Homo sapiens*, Cultural evolution of Man, Molecular analysis of human origin.

References Books

1. Gilbert, S. F. (2006). *Developmental Biology*, VIII Edition, Sinauer Associates, Inc., Publishers, Sunderland, Massachusetts, USA.
2. Balinsky, B.I. (2008). *An introduction to Embryology*, International Thomson Computer Press.
3. Carlson, Bruce M (1996). *Patten's Foundations of Embryology*, McGraw Hill, Inc.
4. Ridley, M. (2004). *Evolution*. III Edition. Blackwell Publishing
5. Barton, N. H., Briggs, D. E. G., Eisen, J. A., Goldstein, D. B. and Patel, N. H. (2007). *Evolution*. Cold Spring, Harbour Laboratory Press.
6. Hall, B. K. and Hallgrimson, B. (2008). *Evolution*. IV Edition. Jones and Bartlett Publishers
7. Campbell, N. A. and Reece J. B. (2011). *Biology*. IX Edition, Pearson, Benjamin, Cummings.
8. Douglas, J. Futuyma (1997). *Evolutionary Biology*. Sinauer Associates.