

Course Code	Course Name	Credits
26ZY503	EVOLUTIONARY BIOLOGY	04

### Course Objectives

- To understand the fundamental concepts and principles of evolution.
- To explain the origin and diversification of life through evolutionary processes.
- To develop knowledge on theories of evolution, speciation, and adaptation in organisms.
- To analyze evidences of evolution from morphology, embryology, genetics, and molecular biology.
- To enhance scientific reasoning and analytical skills in understanding evolutionary relationships and biodiversity.

### Learning Outcomes

- Explain the basic concepts, theories, and evidences of evolution.
- Differentiate various mechanisms of evolution such as natural selection, mutation, genetic drift, and speciation.
- Examine evolutionary trends and adaptations among different groups of organisms.
- Analyze human evolution and molecular aspects of evolutionary biology.
- Apply evolutionary principles in biological research, conservation, and environmental studies.

### Unit 1 – Origin of Life (12 Hrs.)

Chemical evolution of life, Oparin and Haldane theory, Miller and Urey experiment, Biogenesis and Abiogenesis. Evidences of Evolution- Morphological evidences, Anatomical evidences, Embryological evidences, Paleontological evidences, Vestigial organs and connecting links, Molecular evidences

### Unit 2 – Theories and Mechanisms of Evolution (12 Hrs.)

Lamarckism and inheritance of acquired characters, Darwinism and Natural Selection, Neo-Darwinism. Sources of Variation- Mutation, Recombination, Genetic variation. Mechanisms of Evolution - Natural selection, Genetic drift, Gene flow, Isolation, Adaptive radiation, Hardy–Weinberg Principle, Genetic equilibrium, Factors affecting equilibrium. founder's effect, bottleneck phenomenon.

### Unit 3 - Speciation and Adaptation (12 Hrs.)

Species Concept- Biological species concept- Types of species. Speciation- Allopatric speciation, Sympatric speciation, Parapatric speciation. Isolating Mechanisms. Adaptation- Structural adaptations, Physiological adaptations, Behavioral adaptations, Mimicry and camouflage.

### Unit 4 – Molecular Evolution and Evolutionary Genetics (12 Hrs.)

Molecular Evolution- DNA and protein evolution, Molecular clock hypothesis. Population Genetics- Gene pool and gene frequency, Genetic polymorphism, Role of mutation and selection in populations. Modern Synthetic Theory, Modern concepts of evolution. Contributions of population genetics to evolution

### Unit 5 - Human Evolution (12 Hrs.)

Origin and Evolution of Primates- Characteristics of primates, Evolutionary trends in primates. Fossil Records of Human Evolution – Australopithecus, Homo habilis, Homo erectus, Neanderthal man, Cro-Magnon man, Modern humans. Human Evolution- Biological evolution of humans and Cultural evolution.

### Reference Books:

1. Campbell, N.A. and Reece J.B (2011). Biology. IX Edition. Pearson, Benjamin, Cummings.
2. Rastogi B.B., (2018). Organic Evolution, MedTech; 3rd edition
3. B.K. and Hallgrimson, B. (2008). Evolution IV Edition. Jones and Barlett Publishers.
4. Douglas, J. Futuyma (1997). Evolutionary Biology. Sinauer Associates. Snustad. S Principles of Genetics.
5. Ridley, M (2004) Evolution III Edition Blackwell publishing Hall.

### Websites and eLearning Sources:

- <https://evolution.berkeley.edu>
- <https://www.biologydiscussion.com/evolution>
- <https://www.easybiologyclass.com/category/evolution/>