



जम्मू केन्द्रीय विश्वविद्यालय
Central University of Jammu

राया-सुचानी (बगला), जिला: सांबा-181143, जम्मू (जम्मू और कश्मीर), भारत
Rahya-Suchani (Bagla), District- Samba, 181143, Jammu (Jammu and Kashmir), India

(Elective course)

Course Title: Evolutionary Biology

Credit: 4 (L-4, T-0, P-0)

Course code:

Contact Hrs/Week: 4 Hrs

Course Outcomes

Student should be equipped to understand the fundamental principles of evolutionary theory, including natural selection, genetic drift, mutation, and gene flow. Understand the historical development of evolutionary thought and key figures in its history.

Course Learning Outcomes (CLO): The students will be able to:

1. Students will be able to analyze the mechanisms of evolution at the molecular, organismal, and population levels.
2. Interpret the processes that lead to speciation and the maintenance of species.
3. Utilize phylogenetic trees to understand evolutionary relationships among species.
4. Critically assess different types of evidence for evolution, including fossil records, comparative anatomy, molecular biology, and biogeography.

Unit I

Chemogeny, RNA World, Biogeny, Origin of photosynthesis, Endo-symbiotic theory. Lamarckism, Darwinism, Neo-Darwinism.

Unit II

Palaeontological: Fossils (formation, types, and dating); Geological time scale; Study of horse phylogeny; Molecular: neutral theory of molecular evolution, Molecular clock, Phylogenetic trees: types, interpretation, and applications. Variations: Heritable variations and their role in evolution.

Unit III

Natural selection, Types of selection, kin selection, adaptive resemblances, sexual selection. frequency-dependent selection, selection coefficient, genetic drift, migration, and mutation. Hardy-Weinberg Equilibrium: statement, assumptions, derivation of equations for change in allelic frequencies in a population by evolutionary forces upsetting H-W equilibrium.

Unit IV

Speciation: Micro-evolutionary changes (inter-population variations, clines, Ring species, races), Species concept, Isolating mechanisms, Modes of speciation, Adaptive radiation/macroevolution, Phyletic gradualism, and punctuated equilibrium. Mass extinctions (events, causes, and effects), Detailed explanation of K-T extinction.

Unit V

Unique hominin characteristics contrasted with primate characteristics, primate phylogeny from Dryopithecus leading to Homo sapiens, molecular evidence in human evolution.



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Suggested Readings:

1. Ridley, M. (2004). Evolution. III Edition, Blackwell Publishing.
2. Peter Gluckman, Alan Beedle, and Mark Hanson (2009). Principles of Evolutionary Medicine.
3. Douglas, J. Futuyma (1997). Evolutionary Biology. Sinauer Associates.
4. Charles Darwin (1859). The origin of species.
5. Campbell, N.A. and Reece J.B. (2011). Biology. IX Edition. Pearson, Benjamin, Cummings.
6. Hall, B.K. and Hallgrimson, B. (2013). Evolution. V Edition, Jones and Barlett Publishers.