

Introduction:

Evolution is the unifying concept of biological science. Most people are familiar with evolution as the subject of controversy in elementary and high school education. In reality, evolutionary ideas link all the different fields of biology.

Course Objectives:

1. To provide detailed account based on origin of life
2. To develop some basic concepts and ideas for causing evolutionary changes.
3. To determine the significance of systematic in relation to their nomenclature.

Course Learning Outcomes:

1. To **ACQUIRE** basic knowledge for the factors and theories related to the origin of life.
2. To **UNDERSTAND** the vital concepts proposed by various scientists for the appearance of life on earth.
3. To **SOLVE** the critical issues for the discrepancies based on origin of life.
4. To **ANALYZE** certain issues regarding the animal phyla, classes, orders till sub-species levels.

Course Contents:

Origin of life: Panspermia and Chemical Course Contents; The causes of micro-evolution; Hardy-Weinberg equilibrium, Mutation, Gene flow, Genetic drift, Nonrandom breeding, and natural selection. Types of natural selection, its measurement. Causes of polymorphism in populations. The general selection model: (one locus and two locus), Genetic load, Cost of selection, Hitch-hiking, Linkage disequilibrium and shifting balance Course Contents: Fitness and its measurement, Dependence of fitness on frequency of individual. Concept of phenotypic variation: Polygenic traits and Heritability. Explanation for adaptation, genetics of adaptation, reasons of imperfect adaptation. The Units of selection (allele, cell line, organisms, kin group and group). Sexual selection, Theories of

sexual selection; Darwin, Fisher and Zahavi. Macroevolution: Evolutionary developmental biology: allometry, heterochrony, species selection, Evolutionary innovation and origin of higher taxa. Rates of evolution; Evolutionary trends and laws, Gradualism and punctuated equilibrium. Coevolution and co adaptations.

Teaching-Learning Strategies

Teaching will be a combination of class lectures, class discussions, and group work. Short videos /films will be shown on occasion.

Assignments

The sessional work will be a combination of written assignments, class quizzes, presentation, and class participation/attendance.

Assessments and Examination

Sessional Work:	25 marks
Midterm Exam:	35 marks
Final term Exam:	40 marks

Text Books:

1. Ridley, M. 2004. Evolution, 3rd Ed. Blackwell Science.

Books Recommended:

1. Bell, G. 2012. Selection: the mechanism of evolution. Chapman and Hall, NY.
2. Dawkins, R. 2015. The blind watchmaker. Longman Scientific and Technical. Essex, England.
3. Dawkins, R. 2016. The selfish gene. Oxford University Press, NY.
4. Freeman, S. and Herron, J. C. 2015. Evolutionary analysis, 3rd ed. Pearson Prentice Hall.
5. Futuyma, D. J. 1997. Evolutionary Biology, 3rd ed. Sinauer Associates, Inc. Sunderland, Massachusetts.
6. Gould, S. J. 1977. Ever since Darwin. W. W. Norton and Company, NY.
7. Ridley, M. 2017. Genome. New York: Perennial. Great reading.
8. Stearns, S. C. and Hoekstra, R. F. 2000. Evolution, an introduction. Oxford University Press.
9. Strickberger, 2017 (3rd or latest Ed.) Evolution. Jones and Barrett Publishers.
10. Freeman Dyson, (1999). Origin of life, Cambridge University press.

Z-4704 Evolution(Lab.)

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Course Contents:

Simulate that show effects of natural selection and adaptation in changing environments, genetic drift, and the importance of population size in natural population. Calculations for change in gene frequency when selection, genetic drift and migration effect the population, Calculation to assess linkage disequilibrium in the population, Discussion on evidences of evolution and their problems.

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