Institute of Zoology
Faculty of Life sciences
University of the Punjab, Lahore
Course Outline

Programme	BS Zoology	**Course Code**	**ZOOL-417**	**Credit Hours**	2
Course Title	**Evolution**				

Course Introduction

Evolution is one of the main topics in biology, and also one of the most fascinating phenomena in nature! This course is an introduction to evolutionary biology and the evolutionary process. In this introductory course, students will know the genetic basis of evolution: the nature of the genetic information; the main mechanisms of evolution, such as natural selection, crossing over and mutation. Along with that an overview of the rate of evolution in the past, process of speciation, and extinction of the species will also be discussed.

Learning Outcomes

On the completion of the course, the students will:

1. Understand the fundamental principles of evolution and analyze the mechanisms of evolutionary changes
2. Evaluate the role of evolution in shaping the diversity of life on Earth.
3. Investigate the evolution of specific trait, behavior and species
4. Develop critical thinking skill to evaluate scientific arguments and evidences related to evolution
5. Integrate evolution with other scientific disciplines as genetics, ecology, zoogeography, paleontology, etc.

	Course Content	**Assignments/Readings**
Week 1	Introduction of Evolution	
	Origin of life: Panspermia	
Week 2	Chemical theory in brief	Problems in theory of chemical origin
	Hardy-Weinberg equilibrium,	
Week 3	The causes of micro-evolution: Mutation, Gene flow	
	The causes of micro-evolution: Natural Selection	
Week 4	Types of natural selection	Different methods to measure Fitness of the population
	one locus selection model	
Week 5	Causes of polymorphism in populations when natural selection works	
	Genetic drift	
Week 6	Nonrandom breeding, Genetic load, Cost of selection, Hitch-hiking	
	Linkage disequilibrium	
Week 7	Two locus selection model	Effect of linkage disequilibrium on evolution
	Causes of Linkage disequilibrium	
Week 8	Shifting balance theory	
	Concept of phenotypic variation: Polygenic traits	
Week 9	Concept of phenotypic variation: Heritability	
	Explanation for adaptation, genetics of adaptation,	
Week 10	reasons of imperfect adaptation	

	The Units of selection ; allele	
Week 11	The Units of selection; cell line, organisms, kin group	
	The Units of selection; group	
Week 12	Ultimate Units of selection	Other theories of sexual selection
	Theories of sexual selection; Darwin, Fisher	
Week 13	Theories of sexual selection; Zahavi	
	Evolutionary developmental biology: allometery	
Week 14	Evolutionary developmental biology: heterochrony	
	species selection, Evolutionary innovation and origin of higher taxa	
Week 15	Rates of evolution; Evolutionary trends and laws	Relationship between extinction and rate of evolution
	Rates of evolution; Gradualism and punctuated equilibrium	
Week 16	Coevolution	
	co adaptations	

Textbooks and Reading Material

1. Textbooks.
   Ridley, M. 2011. Evolution. Blackwell Scientific Publications, New York, USA (Third edition)
2. Suggested Readings
   i. Strickberger. M.W. 2012. Evolution. Jones & Barrett Publishers. Gower Street, London,England.
   ii. Moody, P.A. 1989. *Introduction to Evolution*, Harper and Row, Publishers, NewYork
   iii. Wiley, E. O. and Lieberman, B. S. 2011. Phylogenetics: Theory and Practical Practice of Phylogenetic systematics. 2nd Ed.Wiley-Blackwell.
   iv. Bell, G.2009. Selection, the mechanism of evolution 2nd edition. Oxford university press

Teaching Learning Strategies

Lecture, Discussion

Assignments: Types and Number with Calendar

Four written assignments, 5 marks each

Assessment

Sr. No.	Elements	Weightage	Details
1.	Midterm Assessment	35%	Written Assessment at the mid-point of the semester.
2.	Formative Assessment	25%	Continuous assessment includes: Classroom participation, assignments, presentations, viva voce, attitude and behavior,
3.	Final Assessment	40%	Written Examination at the end of the semester.