Programme: M. Sc. (Zoology) Course Code: ZOO-404 Number of Credits: 2 Effective from AY: 2018-19

Prerequisites for the	Should have studied B. Sc. Zoology with assumption	
course:	that the student has a basic and working knowledge of	
	classical evolutionary biology	
<u>Objective:</u>	This course develops concepts in classical laws of	
	thermodynamics and their application, postulates of	
	statistical mechanics, statistical interpretation of	
	thermodynamics, microcanonical, canonical and grants	
	canonical ensembles; the methods of statistical	
	mechanics are used to develop the statistics for Bose-	
	Einstein, Fermi-Dirac and photon gases.	
<u>Content:</u>	<b>Module 1:</b> Evolutionary theories and evidences: Contributions of Lamarckism, Darwin-Wallace postulates, Overview of evidencesPaleontological, Embryological, - Comparative morphological, Anatomical, Genetics and Cytological, Molecular Biological evidences, limitations of Darwinism, Neo Darwinism Evolutionary forces that affect the allelic frequencies: Mutation, Migration, Selection - Stabilizing selection, Directional selection, disruptive selection, Balancing selection, Frequency dependent selection, Density dependent selection, Group and kin selection, Selection coefficient, Selective value, Selection in natural Populations, Genetic drift, Non- random mating.	12 hours
	<b>Module 2:</b> Concept of species and models of speciation based on distribution-sympatric, allopatric, stasipatric, based on genetic drift-genetic revolution, genetic transilience, Founder-flush theory, hybridization and speciation, phylogenetic gradualism, punctuated equilibrium, chromosomal phylogeny, molecular phylogeny, neutral theory, molecular clock, isolating mechanisms, Creation and evolution models.	12 hours
Pedagogy:	Lectures/ tutorials/assignments/self-study	
<u>References/Readings</u>	<ol> <li>Andrew Ferguson, Biochemical Systematics and Evolution, Blackie Publ., London 2.</li> <li>Douglas J Futuyma, Evolutionary Biology (3rd Edition), Sinauer Associates, New York.</li> <li>Douglas J Futuyma, Evolution, Sinauer associates, New York</li> <li>Mark Ridley, Evolution (3rd edition), Blackwell Publishers, New York.</li> <li>Michael R Rose and Laurence D Mueller, Evolution and Ecology of the Organism, Prentice Hall, New York</li> </ol>	

Learning Outcomes	1. Explain statistical physics and thermodynamics as logical consequences of the postulates of statistical
	<ul><li>mechanics.</li><li>2. Apply the principles of statistical mechanics to selected problems.</li></ul>
	3. Apply techniques from statistical mechanics to a range of situations.