

SYLLABUS & PROGRAMME STRUCTURE

Zoology

(General)

(Choice Based Credit System)

(Effective from the Academic Session 2017-2018)

Fourth Semester

MAHARAJA BIR BIKRAM UNIVERSITY
AGARTALA, TRIPURA: 799004

PROGRAMME STRUCTURE

Structure of Proposed CBCS Syllabus for B.Sc. (General)

Semester	Core Course (12)	Ability Enhancement Compulsory Course (AECC) (2)	Skill Enhancement Course (SEC) (4)	Discipline Specific Elective (DSE) (6)
1	DSC- 1 A (Paper-I of choice of subject-I)	AECC-1 Environmental Science		
	DSC- 2 A(Paper-I of choice of subject-II)			
	DSC- 3 A(Paper-I of choice of subject-III)			
2	DSC- 1 B(Paper-II of choice of subject-I)	AECC2 (English/MIL (Communication))		
	DSC- 2 B(Paper-II of choice of subject-II)			
	DSC- 3 B(Paper-II of choice of subject-II)			
3	DSC- 1 C(Paper-III of choice of subject-I)		SEC1 (From Subject-1)	
	DSC- 2 C(Paper-III of choice of subject- II)			
	DSC- 3 C(Paper-III of choice of subject- III)			
4	DSC- 1 D(Paper-IV of choice of subject-I)		SEC2 (From Subject-1I)	
	DSC- 2 D(Paper-IV of choice of subject- II)			
	DSC- 3 D(Paper-IV of choice of subject- III)			
5			SEC3 (From Subject-1II)	DSE1A (From Subject-1)
				DSE2A (From Subject-1I)
				DSE3A (From Subject-1II)
6			SEC4 (From any one of Subject-1, II & III) or from the computer course prescribed for BSc (General)	DSE1B (From Subject-1)
				DSE2B (From Subject-1I)
				DSE3B (From Subject-1II)

Semester - IV
DSC – Paper - IV
GENETICS AND EVOLUTIONARY BIOLOGY

TOTAL MARKS – 100
[Theory – (60+10), Practical-(20+10)]

THEORY

Credits: 04

Unit - I

Mendelian Genetics and its Extension:

- a) Mendel's work on transmission of traits, Principles of Inheritance, Chromosome theory of Inheritance.
- b) Incomplete dominance and co-dominance, Multiple alleles, Lethal alleles, Epistasis, Pleiotropy, Sex linked inheritance.
- c) Extra-chromosomal inheritance.

Unit- II

Linkage, Crossing Over and Chromosomal Mapping:

- a) Linkage, Crossing over, Recombination Frequency, Interference and coincidence, Two factor and three factor crosses in Gene mapping.
- b) Chromosomal Mutations: Deletion, Duplication, Inversion, Translocation, Aneuploidy and Polyploidy, Gene mutations: Induced versus Spontaneous mutations, Detection of mutation by CLB Method.
- c) Chromosomal mechanisms of sex determination in *Drosophila* & man, Dosage compensation – Sex chromatin & Barr Body.

Unit – III

History of Life, Evolutionary Theories, Evidences & Process of Evolution:

- a) Major Events in History of Life, Lamarckism, Darwinism and Neo-Darwinism.
- b) Types of fossils, Incompleteness of fossil record, Dating of fossils, Evolution of Horse in Time & Space.
- c) Isolating Mechanisms, Natural selection (Ex. Industrial melanism); Types of natural selection (Directional, Stabilizing, Disruptive), Artificial Selection.

Unit – IV

Species Concept, Macro-evolution & Extinction:

- a) Biological species concept (Advantages and Limitations); Modes of speciation.
- b) Causes of Extinction, Role of extinction in evolution.
- c) Mass extinction (Causes & names of five major extinctions, K-T Event).

PRACTICAL

Credits - 02

1. Verification of the results / data using Chi-square test (Study of Mendelian Ratios / Sex Ratios).
2. Pedigree analysis of some human inherited traits.
3. Study of Human Karyotypes (normal and abnormal).
4. Study of Beaks and Feet of birds with Chart / Model / Photograph.
5. Study of Mitosis with Onion Root tips.

NOTE: Assignment / Project preparation on any one of the followings (Internal Assessment only for valuation of 10 Marks including Interaction):

1. Study of fossil evidences from plaster cast models and pictures.
2. Study of homology and analogy from suitable specimens / pictures.
3. Phylogeny of horse with diagrams / cut outs of limbs and teeth of horse ancestors.
4. Visit to Natural History Museum and submission of Report.

Suggested Readings:

1. *Gardener, E.J., Simmons, M.J., Snustad, D.P. 92008). Principles of Genetics. VIII Edition. Willey India.*
2. *Snustad, D.P., Simmons, M.J.(2009). Principles of Genetics. V Edition. John Wiley and Sons Inc.*
3. *Klug, W.S., Cummings, M.R., Spencer, C.A. (2012). Concepts of Genetics. X Edition. Benjamin Cummings.*
4. *Russel, P.J. 92009). Genetics – A Molecular Approach. III Edition. Benjamin Cummings.*
5. *Griffiths, A.J.F., Wessler, S.R., Lewontin, R.C. and Carrol, S.B. (2015). Introduction to Genetics Analysis. Latest Edition. W.H. Freeman and Co.*
6. *Ridley, M. (2004). Evolution. III Edition. Blackwell Publishing.*
7. *Barton, N.H., Briggs, D.E.G., Eisen, J.A., Goldstein, D.B. and Patel, N.H. (2007). Evolution. Cold Spring, Harbour Laboratory Press.*
8. *Hall, B.K. and Hallgrimsson, B. (2008). Evolution. IV Edition. Jones and Bartlett Publishers.*
9. *Campbell, N.A. and Reece J.B. (2011). Biology. IX Edition, Pearson, Benjamin, Cummings.*
10. *Douglas, J. Futuyma (1997). Evolutionary Biology. Sinauer Associates.*