B.Sc. ZOOLOGY SYLLABUS UNDER CBCS
(With effect from 2016-2017)
IV - SEMESTER
DSC-1D (Theory)
Cell and Molecular Biology, Genetics, Evolution

Max. Marks: 80

UNIT – I

1.1 Cell theory; Differences of Prokaryotic and Eukaryotic cells.
1.2 Ultrastructure of animal cell; Structure and functions of plasma membrane proteins.
1.3 Structure and functions of cell organelles – Endoplasmic reticulum, Golgi body, Ribosomes, Lysosomes, centrosomes, Mitochondria and Nucleus.
1.4 Chromosomes – Structure, types, giant chromosomes.
1.5 Cell Division - Mitosis, Meiosis; Cell cycle and its regulation.

UNIT – II

2.1 DNA (Deoxyribo Nucleic Acid) – Structure; DNA Replication.
2.2 RNA (Ribo Nucleic Acid) - Structure, types.
2.3 Protein Synthesis – Transcription and Translation.
2.4 Gene Expression – Genetic Code; operon concept.
2.5 Molecular Biology Techniques - Polymerase Chain Reaction, Electrophoresis

UNIT – III

3.1 Mendals laws of Inheritance and Non-Medelian Inheritance; Linkage and Crossing over.
3.2 Sex determination and sex-linked inheritance
3.3 Chromosomal Mutations- Deletion, Duplication, Inversion, Translocation, Aneuploidy and Polyploidy.
3.4.Gene mutations- Induced versus Spontaneous mutations.
3.5.Inborn errors of metabolism; One gene one enzyme, one gene one polypeptide theory.

UNIT – IV

4.1 Theories of evolution – Lamarckism and Neo-Lamarckism, Darwinism and Neo Darwinism, Modern synthetic theory.
4.2 Evidences of Evolution and Hardy Weinberg Law; Forces of Evolution – mutation, Gene flow, genetic drift, and natural selection.
4.3 Isolation – Pre-mating and post mating isolating mechanisms.
4.4 Speciation: Methods of speciation - Allopatric and sympatric.
4.5 Causes and Role of Extinction in Evolution.

Suggested readings

1. **Lodish, Berk, Zipursky, Matsudaria, Baltimore, Darnel**l *'Molecular Cell Biology'* W.H. Free man and company New York..
2. **Gardner, E.J., Simmons, M.J., Snustad, D.P. (2008).** *Principles of Genetics*. VIII Edition.Wiley India.
3. **Snustad, D.P., Simmons, M.J. (2009).** *Principles of Genetics*. V Edition.John Wiley and Sons Inc.
4. **Klug, W.S., Cummings, M.R., Spencer, C.A. (2012).** *Concepts of Genetics*. X Edition. Benjamin Cummings.
5. **Russell, P. J. (2009).** *Genetics- A Molecular Approach.* III Edition. Benjamin Cummings.
6. **Griffiths, A.J.F., Wessler, S.R., Lewontin, R.C. and Carroll, S.B.** *Introduction to Genetic Analysis*. IX Edition. W. H. Freeman and Co.
7. **Ridley, M. (2004).** *Evolution*. III Edition. Blackwell Publishing
8. **Barton, N. H., Briggs, D. E. G., Eisen, J. A., Goldstein, D. B. and Patel, N. H. (2007).** *Evolution*. Cold Spring, Harbour Laboratory Press.
9. **Hall, B. K. and Hallgrimsson, B. (2008).** *Evolution*. IV Edition. Jones and Bartlett Publishers
10. **Campbell, N. A. and Reece J. B. (2011).** *Biology*. IX Edition, Pearson, Benjamin, Cummings.
11. **Douglas, J. Futuyma (1997).** *Evolutionary Biology*. Sinauer Associates.
12. **Minkoff, E. (1983).** *Evolutionary Biology*. Addison-Wesley.
13. **James D. Watson, Nancy H. Hopkins** '*Molecular Biology of the Gene'*
14. **Jan M. Savage**. *Evolution*, 2nd ed, Oxford and IBH Publishing Co., New Delhi.
15. **Gupta P.K**., 'Genetics'

ZOOLOGY PRACTICAL SYLLABUS FOR III SEMESTER

ZOOLOGY (DSC-1D)

Cell and Molecular Biology, Genetics and Evolution

Max. Marks: 50

I. Cytology

1. Preparation and Identification of slides of Mitotic divisions with onion root tips
2. Preparation and Identification of different stages of Meiosis in Grasshopper Testes
3. Identification and study of the following slides
    i). Different stages of Mitosis and Meiosis
    ii) Lamp brush and Polytene chromosomes

II. Genetics

1. Problems on Genetics - Mendelian inheritance, Linkage and crossing over, Sex linked inheritance

III. Evolution

1. Museum Study of Fossil animals: *Peripatus, Coelacanth Fish, Dipnoi fishes, Sphenodon, Archeopteryx*.
2. Study of homology and analogy from suitable specimens and pictures
3. Problems on Hardy-Weinberg Law
4. Macroevolution using Darwin finches (pictures)

Laboratory Record work shall be submitted at the time of practical examination

An **"Album"** containing photographs, cut outs, with appropriate write-up about Genetics and Evolution.

Computer aided techniques should be adopted as per UGC guide lines.

Suggested manuals

Manual of laboratory experiments in cell biology Edward, G.