

# B.Sc. Life Sciences-Zoology

## Column 1: Outline of the Syllabus (Blocks and Units details)

### Semester- I: Non-Chordates

Following are four Blocks in *Non Chordates* paper and each block has four units. Further there are two blocks in the Practical syllabus each having four units.

**Block 1:** Basis of Classification and Lower Invertebrates

**Block 2:** Phylum Platyhelminthes to Annelida

**Block 3:** Phylum Onychophora, Arthropoda and Mollusca

**Block 4:** Phylum Echinodermata and Hemichordata

### Semester - II: Chordates

Following are four Blocks in *Chordates* paper and each block has four units. Further there are two blocks in the Practical syllabus each having four units.

**Block 1:** General account and Classification of Protochordates, Agnatha and Pisces

**Block 2:** General account and Classification of Amphibians, Reptiles, Aves and Mammals

**Block 3:** Comparative anatomy of Integumentary, Skeletal Digestive and Respiratory System

**Block 4:** Comparative anatomy of Circulatory, Urino-genital and Nervous System

### Semester- III: Physiology and Biochemistry

Following are four Blocks in *Physiology and Biochemistry* paper and each block has four units. Further there are two blocks in the Practical syllabus each having four units.

**Block 1:** Biomolecules and Metabolism of Carbohydrates: Proteins: Enzymes Nucleic acids-  
Lipids:

**Block 2:** Physiology of Digestive, Respiratory, Circulatory,

**Block 3:** Physiology of Excretory, Nervous and Muscular System

**Block 4:** Reproduction and Endocrine System

### Semester-IV: Genetics and Evolutionary Biology

Following are four Blocks in *Genetics and Evolutionary Biology* paper and each block has four units. Further there are two blocks in the Practical syllabus each having four units.

**Block 1:** Introduction to Genetics: Mendelian Principles of Inheritance and Inheritance

patterns

**Block 2:** Linkage Crossing over and Sex determination: Mutations

**Block3:** History of Life, Evolutionary theories, fossils, Phylogeny of horse, Processes of Evolutionary Change

**Block 4:** Species Concept, Macro and Macro-evolutionary Principles Extinction

### **Semester-V: Applied Zoology and Developmental Biology:**

Following are four Blocks in *Applied Zoology and Developmental Biology* paper and each block has four units. Further there are two blocks in the Practical syllabus each having four units.

**Block 1:** Introduction to Host-parasite Relationship Insects of Economic importance -

**Block 2:** Animal Husbandry- Poultry Farming, Pisciculture

**Block 3:** Theories of Preformation, Types of eggs, Cleavage, Blastulation, Gastrulation, cell lineage and Development of Frog

**Block 4:** Development of Chick, Development of Man, Experimental Embryology

### **Semester-VI: Animal Biotechnology**

Following are four Blocks in *Animal Biotechnology* paper and each block has four units. Further there are two blocks in the Practical syllabus each having four units.

**Block 1:** Animal Cell and Tissue Culture

**Block 2:** Molecular Techniques in Gene manipulation

**Block 3:** Genetically Modified Animals

**Block 4:** Applications in Human Health

### **Column 2: Source of Self Learning Material (Self-Prepared/Borrowed from...)**

Self Prepared

### **Column 3: Reference of Self Learning Material (List of reference books mentioned in the syllabus).**

#### **Semester- I: Non-Chordates**

- \* Barnes, R.D. (1982). *Invertebrate Zoology*, V Edition
- \* Janet Moore (2006). *An Introduction to the Invertebrates*, Cambridge University Press 2006
- \* Jan Pechenik (2014). *Biology of the Invertebrates*, McGraw-Hill Science, 2014
- \* Kotpal Volumes Protozoa through Echinodermata, Rastogi Publications

- \* Jordan & Verma (revised editions) Invertebrate Zoology, S. Chand and Co. Ltd., New Delhi.

### **Semester - II: Chordates**

- \* Kardong, K.V. (2005) *Vertebrates' Comparative Anatomy, Function and Evolution*. IV Edition. McGraw-Hill Higher Education.
- \* Kent, G.C. and Carr R.K. (2000). *Comparative Anatomy of the Vertebrates*. IX Edition. The McGraw-Hill Companies.
- \* Hilderbrand, M and Gaslow G.E. *Analysis of Vertebrate Structure*, John Wiley and Sons.
- \* Cleveland P. Hickman et.al. (2008). *Animal Diversity*, McGraw-Hill Higher Education
- \* Peter J. Bryant (2009). *Biodiversity and Conservation* - University of California, Irvine
- \* Kotpal (2015). *Modern Textbook Of Zoology Vertebrates*, Rastogi publishers, New Delhi
- \* Jordan E.L. and Verma P.S. (2010). *Chordate Zoology*, S. Chand & Co, New Delhi
- \* Saxena, R.K. and Saxena, S. (2015). *Comparative Anatomy of Vertebrates*, Viva Books, Delhi

### **Semester- III: Physiology and Biochemistry**

- \* Tortora, G.J. and Derrickson, B.H. (2009). *Principles of Anatomy and Physiology*, XII Edition, John Wiley & Sons, Inc.
- \* Widmaier, E.P., Raff, H. and Strang, K.T. (2008) *Vander's Human Physiology*, XI Edition., McGraw Hill
- \* Guyton, A.C. and Hall, J.E. (2011). *Textbook of Medical Physiology*, XII Edition, Harcourt Asia Pvt. Ltd/ W.B. Saunders Company
- \* Berg, J. M., Tymoczko, J. L. and Stryer, L. (2006). *Biochemistry*. VI Edition. W.H Freeman and Co.
- \* Nelson, D. L., Cox, M. M. and Lehninger, A.L. (2009). *Principles of Biochemistry*. IV Edition. W.H. Freeman and Co.
- \* Murray, R.K., Granner, D.K., Mayes, P.A. and Rodwell, V.W. (2009). *Harper's Illustrated Biochemistry*. XXVIII Edition. Lange Medical Books/Mc Graw Hill.
- \* Singh. H.R, & Neeraj Kumar (2017) *Animal Physiology and Biochemistry*, Vishal Publishing Co
- \* Nagabhushanam, (2008) , *Textbook Of Animal Physiology*, Oxford & IBH. Rastogi, S.C. (2007). *Essentials of Animal Physiology*, New Age International Publishers

### **Semester-IV: Genetics and Evolutionary Biology**

- \* Bhasaran, K.K. & Biju Kumar, A.: *Cell Biology, Genetics & Molecular Biology*.
- \* Brooks, R. J.: *Genetics: Analysis and Principles*. 1999, Addison Wesley
- \* Gardner, E. J. et al.: *Principles of Genetics*. 8e, 200 J W & S.
- \* Robert H. Tamarin, *Principles of Genetics*.
- \* Sharma, A., *Chromosomes*. 1992, Oxford & IBH
- \* Vijayakumaran Nair, K. & Jayaprakash, M.: *Cell Biology, Genetics, Molecular Biology*. Academica, TVM.
- \* Ridley, M. (2004). *Evolution*. III Edition. Blackwell Publishing

- \* Barton, N. H., Briggs, D. E. G., Eisen, J. A., Goldstein, D. B. and Patel, N. H.(2007).
- \* *Evolution*. Cold Spring, Harbour Laboratory Press.
- \* Hall, B. K. and Hallgrímsson, B. (2008). *Evolution*. IV Edition. Jones and Bartlett Publishers
- \* Verma & Agarwal (2006) *Cell Biology, Genetics, Molecular Biology, Evolution & Ecology*, S. Chand publishers
- \* Carl T. Bergstrom & Lee Alan Dugatkin (2012). *Evolution*, W. W. Norton & Company; International student edition
- \* Brian K. Hall & Benedikt Hallgrímsson (2013) *Strickberger's Evolution* Paperback, Jones & Bartlett Learning.

#### **Semester-V: Applied Zoology and Developmental Biology:**

- \* Gilbert, S. F. (2006). *Developmental Biology*, VIII Edition, Sinauer Associates, Inc., Publishers, Sunderland, Massachusetts, USA.
- \* Balinsky, B.I. (2012). *An introduction to Embryology*, Cengage Learning India
- \* Carlson, Bruce M (1996). *Patten's Foundations of Embryology*, McGraw Hill, Inc.
- \* Park, K. (2007). *Preventive and Social Medicine*. XVI Edition. B.B Publishers.
- \* Arora, D. R and Arora, B. (2001). *Medical Parasitology*. II Edition. CBS Publications and Distributors.
- \* Kumar and Corton. *Pathological Basis of Diseases*.
- \* Atwal, A.S. (1986). *Agricultural Pests of India and South East Asia*, Kalyani Publishers.
- \* Hafez, E. S. E. (1962). *Reproduction in Farm Animals*. Lea & Fabiger Publisher
- \* Dunham R.A. (2004). *Aquaculture and Fisheries Biotechnology Genetic Approaches*. CABI publications, U.K.
- \* Pedigo, L.P. (2002). *Entomology and Pest Management*, Prentice Hall.
- \* Verma & Agarwal (2010). *Chordate Embryology*, S. Chand Publishers
- \* Shukla, G.S. & Upadhyay, V.B. (2014). *Applied And Economic Zoology*, Rastogi Publications

#### **Semester-VI: Animal Biotechnology**

- \* Brown, T.A. (1998). *Molecular Biology Labfax II: Gene Cloning and DNA Analysis*. II Edition, Academic Press, California, USA.
- \* Glick, B.R. and Pasternak, J.J. (2009). *Molecular Biotechnology - Principles and applications of Recombinant DNA*. IV Edition, ASM press, Washington, USA.
- \* Griffiths, A.J.F., J.H. Miller, Suzuki, D.T., Lewontin, R.C. and Gelbart, W.M. (2009). *An Introduction to Genetic Analysis*. IX Edition. Freeman and Co., N.Y., USA.
- \* Snustad, D.P. and Simmons, M.J. (2009). *Principles of Genetics*. V Edition, John Wiley and Sons Inc.
- \* Watson, J.D., Myers, R.M., Caudy, A. and Witkowski, J.K. (2007). *Recombinant DNA Genes and Genomes- A Short Course*. III Edition, Freeman and Co., N.Y., USA.
- \* Beauchamp, T.I. and Childress, J.F. (2008). *Principles of Biomedical Ethics*. VI Edition, Oxford University Press.
- \* Kumaresan, V (2014). *Animal Biotechnology*. Saras Publications

- \* Singh, B. & Gautam, S.K. (2013). Textbook of Animal Biotechnology Paperback. The Energy and Resources Institute, TERI

**Table 2: Mode of Evaluation (Weightage)**

<b>S. No.</b>	<b>Programme Name</b>	<b>Assignment</b>	<b>Practical</b>	<b>Project</b>	<b>Term End Examination</b>
<b>1.</b>	<b>B.Sc. Life Sciences Zoology</b>	<b>30</b>	<b>50</b>	<b>-</b>	<b>70</b>