

SHIVAJI UNIVERSITY, KOLHAPUR.



Accredited By NAAC with 'A' Grade

CHOICE BASED CREDIT SYSTEM

Syllabus For

**B.Sc. Part - I
ZOOLOGY**

SEMESTER I AND II

(Syllabus to be implemented from June, 2018 onwards.)

B. Sc. Part – I Semester – I
ZOOLOGY
DSC – 15A (ANIMAL DIVERSITY-I)
Theory: 30 hrs. (37.5 lectures of 48 minutes)
Marks-50 (Credits: 02)

Unit 1:

Kingdom Protista (3 hrs.)

General characters and classification up to classes; Locomotory Organelles and locomotion in Protozoa

Phylum Porifera (3 hrs.)

General characters and classification up to classes; Canal System in *Sycon*

Phylum Cnidaria (3 hrs.)

General characters and classification up to classes; Polymorphism in Hydrozoa

Phylum Platyhelminthes (3 hrs.)

General characters and classification up to classes; Life history of *Taenia solium* and its parasitic adaptations

Phylum Nematelminthes (3 hrs.)

General characters and classification up to classes; Life history of *Ascaris lumbricoides* and its parasitic adaptations

Unit 2:

Phylum Annelida (3 hrs.)

General characters and classification up to classes; Metamerism in Annelida

Phylum Arthropoda (5 hrs.)

General characters and classification up to classes; Vision in Arthropoda, Metamorphosis in Insects

Phylum Mollusca (3 hrs.)

General characters and classification up to classes; Torsion in gastropods

Phylum Echinodermata (4 hrs.)

General characters and classification up to classes; Water-vascular system in Asterozoa

B. Sc. Part – I Semester – I
ZOOLOGY
DSC – 16 A (ANIMAL PHYSIOLOGY)
Theory: 30 hrs. (37.5 lectures of 48 minutes)
Marks-50 (Credits: 02)

Unit 1:

Nerve and muscle (9 hrs.)

Structure of a neuron, Resting membrane potential, Origin of Action potential and its propagation in non-myelinated nerve fibers, Ultra-structure of skeletal muscle, Molecular and chemical basis of muscle contraction

Digestion (6 hrs.)

Physiology of digestion in the alimentary canal; Absorption of carbohydrates, proteins, lipids

Unit 2:

Respiration

Pulmonary ventilation, Transport of Oxygen and carbon dioxide in blood (4 hrs.)

Excretion (5 hrs.)

Structure of nephron, Mechanism of Urine formation, Counter-current Mechanism

Cardiovascular system (6 hrs.)

Composition of blood, Structure of Heart, Origin and conduction of the cardiac impulse, Cardiac cycle

Total Periods – 60

Suggested Readings :

Ruppert and Barnes, R.D. (2006). *Invertebrate Zoology*, VIII Edition. Holt Saunders International Edition.

- Barnes, R.S.K., Calow, P., Olive, P.J.W., Golding, D.W. and Spicer, J.I. (2002). *The Invertebrates: A New Synthesis*, III Edition, Blackwell Science
- Young, J. Z. (2004). *The Life of Vertebrates*. III Edition. Oxford university press.
- Pough H. *Vertebrate life*, VIII Edition, Pearson International.
- Hall B.K. and Hallgrímsson B. (2008). *Strickberger's Evolution*. IV Edition. Jones and Bartlett Publishers Inc.
- 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

B. Sc. Part – I Semester – II
ZOOLOGY
DSC – 15B (CELLBIOLOGYAND EVOLUTIONARY BIOLOGY)
Theory: 30 hrs. (37.5 lectures of 48 minutes)
Marks -50(Credits: 02)

CELL BIOLOGY & EVOLUTIONARY BIOLOGY

UNIT – 1

Cell structure- (2 hrs.)

Cell theory and diversity in cell size and shape

Structure of nucleus – (2 hrs.)

Nucleus with reference to Nuclear membrane, Nucleoplasm, Chromatin and nucleolus.

Structure of Chromosome - (3 hrs.)

With reference to Morphology and organization (Nucleosome), Polytene Chromosomes

Ultra structure and functions of the following (8 hrs.)

Plasma membrane (Fluid Mosaic Model)

Mitochondria

Endoplasmic reticulum

Golgi complex

Lysosome

Unit 2:

History of Life (2 hrs.)

Major Events in History of Life

Introduction to Evolutionary Theories (5 hrs.)

Lamarckism, Darwinism, Neo-Darwinism

Direct Evidences of Evolution (4 hrs.)

Types of fossils, Incompleteness of fossil record, Dating of fossils

Extinction (4 hrs.)

Mass extinction (Causes, Names of five major extinctions, K-T extinction in detail), Role of extinction in evolution

B. Sc. Part – I Semester – II
ZOOLOGY
DSC – 16B (GENETICS)
Theory: 30 hrs. (37.5 lectures of 48 minutes)
Marks -50(**Credits: 02**)

Unit 1:

Introduction to Genetics (3 hrs.)

Mendel's work on transmission of traits, Genetic Variation, Molecular basis of Genetic Information

Mendelian and post Mendelian Genetics (8 hrs.)

Principles of Inheritance, Incomplete dominance and co-dominance, gene interaction, Multiple alleles w.r.t. ABO, Rh blood groups and coat colour in rabbit, sex linked inheritance.

Linkage, Crossing Over (4 hrs.)

Linkage and process of crossing over, Coupling and repulsion theory, Cytological evidence of crossing over.

Unit 2:

Mutations (6 hrs.)

Chromosomal Mutations: Deletion, Duplication, Inversion, Translocation, Aneuploidy and Polyploidy, induced gene mutation.

Sex Determination (9 hrs.)

Sex Chromosomal theory of sex determination, Genic balance theory, Haploidy Diploidy mechanism, Environmental sex determination, dosage compensation.

Total Periods – 60

Suggested Readings :

- De Robertis EDP and De Robertis EME – Cell and Molecular Biology
- C.B. Powar – Cell Biology, Himalaya Pub. House
- Verma P. S. and Agarwal V. K. – Genetics, S. Chand and Company
- Strickberger – Genetics. C Millian Publications
- Winchester – Genetics, Oxford Publication
- Cell Biology – Dr. N. Arumugam
- Genetics by P.P. Meyyan
- P. S. Varma & V. K. Agarwal – Cell Biology, Genetics, Molecular Biology,

- Evolution and Ecology
- R. P. Meyyan, N, Arumugam – Genetics & Evolution
- P. K. Gupta – Cell and Molecular Biology
- Gardner, E.J., Simmons, M.J., Snustad, D.P. (2008). *Principles of Genetics*. VIII Edition. Wiley India.
- Snustad, D.P., Simmons, M.J. (2009). *Principles of Genetics*. V Edition. John Wiley and Sons Inc.
- Klug, W.S., Cummings, M.R., Spencer, C.A. (2012). *Concepts of Genetics*. X Edition. Benjamin Cummings.
- Russell, P. J. (2009). *Genetics- A Molecular Approach*. III Edition. Benjamin Cummings.
- 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.
- 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 Hallgrimsson, B. (2008). *Evolution*. IV Edition. Jones and Bartlett Publishers
- Campbell, N. A. and Reece J. B. (2011). *Biology*. IX Edition, Pearson, Benjamin, Cummings.
- Douglas, J. Futuyma (1997). *Evolutionary Biology*. Sinauer Associates.

B. Sc. Part – I
ZOOLOGY PRACTICALS
Marks -50 (Credits: 02)

DSC– 15A and 16 A : LAB

1. Study of the following specimens:

- i. Study of *Amoeba*, *Euglena*, *Plasmodium*, *Paramecium*, w.r.t. classification and locomotion
- ii. Study of *Sycon*, *Hyalonema*, and *Euplectella*, *Obelia*, *Physalia*, *Aurelia*, *Tubipora*, *Metridium*, *Taenia solium*, Male and female *Ascaris lumbricoides*, *Aphrodite*, *Nereis*, *Pheretima*, *Hirudinaria*, *Palaemon*, *Cancer*, *Limulus*, *Palamnaeus*, *Scolopendra*, *Julus*, *Periplaneta*, *Apis*, *Chiton*, *Dentalium*, *Pila*, *Unio*, *Loligo*, *Sepia*, *Octopus*, *Pentaceros*, *Ophiura*, *Echinus*, *Cucumaria* and *Antedon*, w.r.t. classification and morphological peculiarities.

2. Study of the following :

- i. T.S. and L.S. of *Sycon*,
- ii. Life history *Taeni* and *Ascaris* and their parasitic adaptations.

3. Preparation of hemin and hemochromogen crystals.

4. Study Tour : Visit to Natural History Museum and submission of report.

DSC– 15Band 16B : LAB

5. Identification of ABO and Rh blood groups.

6. Cytological Preparations.:

Mitochondria – Stained preparation of mitochondria from onion peeling / Hydrilla leaf / Oral mucosa by using Janus Green B.

Polytene Chromosome – Stained preparation of Polytene chromosome in chironomous larva/ *Drosophila* larva.

7. Study of fossil evidences from plaster cast models and pictures.

8. Darwin's Finches with diagrams/ cut outs of beaks of different species.

9. Study of Mendelian Inheritance and gene interactions (Non Mendelian Inheritance) using suitable examples. Verify the results using Chi-square test, Study of Linkage, recombination, gene mapping using the data (Minimum 10 Examples on Mono, Dihybrid ratio, Incomplete dominance, Co-dominance, Multiple alleles, Sex linked inheritance, Linkage and Crossing over and Gene interaction).

10. Study of Human Karyotypes.

SUGGESTED READINGS

- Ruppert and Barnes, R.D. (2006). *Invertebrate Zoology*, VIII Edition. Holt Saunders International Edition.
 - Barnes, R.S.K., Calow, P., Olive, P.J.W., Golding, D.W. and Spicer, J.I. (2002). *The Invertebrates: A New Synthesis*, III Edition, Blackwell Science
 - Young, J. Z. (2004). *The Life of Vertebrates*. III Edition. Oxford university press.
 - Pough H. *Vertebrate life*, VIII Edition, Pearson International.
 - Hall B.K. and Hallgrimsson B. (2008). *Strickberger's Evolution*. IV Edition. Jones and Bartlett Publishers Inc.
- Practical Zoology by Kotpal.
- Practical Zoology by Verma and Agarwal.
- Physiology by C. C. Chattarji. Vol. I & II.

SCHEME OF MARKING (THEORY)

SEM	Core Course	Evaluation	Marks	Total Marks	Answer Books	Standard of passing(Min)
I	DSC - 15A	Semester wise	50	100	As per Instructions	35
	DSC - 16A	Semester wise	50			
II	DSC - 15B	Semester wise	50	100	As per Instructions	35
	DSC - 16B	Semester wise	50			

SCHEME OF MARKING (PRACTICAL)

Practical examination is annul

SEM	Course	Marks	Evaluation	Sections	Standard of passing
I and II	DSC – A(DSC 15A and DSC 16A) Lab and DSC - B (DSC 15B and DSC 16B) Lab	50	Annual	As per Instructions	35%