"Dissemination of Education for Knowledge, Science and Culture"
- Shikshanmaharshi Dr. Bapuji Salunkhe

Shri Swami Vivekanand Shikshan Sanstha's

Vivekanand College, Kolhapur (Autonomous)

DEPARTMENT OF ZOOLOGY

B.Sc. Part - II
Semester-III & IV

SYLLABUS

Under Choice Based Credit System

to be implemented from Academic Year 2019-20

B.Sc. II (Sem -III and IV) Zoology

Course Structure

Paper No.	Course code	Title of Old Paper	Title of New Paper	Percentage of Change (%)	No. of Credits
Semester III					
III	**DSC -1008C**	Animal Diversity III and Genetics and Biological Chemistry	Physiology and Biochemistry	100%	04
Semester IV					
IV	**DSC -1008D**	Animal Diversity IV and Histology and physiology	Cell Biology, Genetics and Evolution	100%	04

B. Sc. Part – II CBCS
Semester - III Paper- III
Physiology and Biochemistry (DSC -1008C)
Theory: 72 Hours - (92 lectures of 48 minutes) Credits - 04

Course Outcomes: After the completion of the course the student will be able to -

CO1: Understand how different system works coordinated to maintain homeostatic in the body

CO2: To illustrate the endocrine system, carbohydrates, lipid and protein metabolism.

CO3: To apply the knowledge of physiology and biochemistry to solve the disease related problems/health problems.

CO4: Distinguish between physiology and biochemical functioning of organs and cells of which they composed.

CO5: Interpret the biochemical pathways and enzyme kinetic, compile interaction and interdependence of physiological and biochemical process.

Section I

Unit	Syllabus	Lectures/ Teaching Hours	Credits
Module 1	**Nerve and muscle** Structure of a neuron, Resting membrane potential, Origin of action potential and its propagation in non-myelinated nerve fibres, Ultra-structure of skeletal muscle, Molecular and chemical basis of muscle contraction **Digestion** Physiology of digestion in the alimentary canal; Absorption of carbohydrates, proteins, lipids	**16**	02
Module 2	**Respiration** Pulmonary ventilation, Respiratory volumes and capacities, Transport of Oxygen and carbon dioxide in blood, Respiratory Diseases **Excretion**	**20**	

	Structure of nephron, Mechanism of Urine formation, Counter-current Mechanism **Cardiovascular system** Composition of blood, Structure of Heart, Origin and conduction of the cardiac impulse, Cardiac cycle, Heart Attack-Symptoms and Remedies		

Section II

Unit	**Syllabus**	**Lectures/ Teaching Hours**	**Credits**
Module 1	**Endocrine Glands** Structure and function of pituitary, thyroid, parathyroid, pancreas, adrenal, hypothalamus, tests and ovary **Carbohydrate Metabolism** Glycolysis, Krebs Cycle, Pentose phosphate pathway, Gluconeogenesis, Glycogen metabolism, Review of electron transport chain	**19**	02
Module 2	**Lipid Metabolism** Biosynthesis and β oxidation of palmitic acid **Protein metabolism** Transamination, Deamination and Urea Cycle **Enzymes** Introduction, Mechanism of action, Enzyme Kinetics, Michaelis and Menten equation, Inhibition and Regulation	**17**	

Reference Books:

1. Tortora, G.J. and Derrickson, B.H. (2009). Principles of Anatomy and Physiology, XII Edition, John Wiley & Sons, Inc

2. Widmaier, E.P., Raff, H. and Strang, K.T. (2008) *Vander's Human Physiology*, XI Edition. McGraw Hill
3. Guyton, A.C. and Hall, J.E. (2011). Textbook of Medical Physiology, XII Edition, Harcourt Asia Pvt. Ltd/ W.B. Saunders Company
4. Berg, J. M., Tymoczko, J. L. and Stryer, L. (2006). Biochemistry. VI Edition. W.H Freeman and Co.
5. Nelson, D. L., Cox, M. M. and Lehninger, A.L. (2009). Principles of Biochemistry. IV Edition. W.H. Freeman and Co.
6. Murray, R.K., Granner, D.K., Mayes, P.A. and Rodwell, V.W. (2009). Harper's Illustrated Biochemistry. XXVIII Edition. Lange Medical Books/Mc Graw3Hill.

B. Sc. Part – II CBCS
Semester - IV Paper- IV
Cell Biology, Genetics and Evolution (DSC -1008D)
Theory: 72 Hours - (92 lectures of 48 minutes) Credits - 04

Course Outcomes: After the completion of the course the student will be able to -

CO1: Define the basic terms in cell biology and genetics.

CO2: Explain the ultra-structure and function of cell organelle, Mendelian and post Mendelian genetics.

CO3: Interpret the process of origin of evolution and its evidences.

CO4: Classify the process of fossilization and dating techniques.

CO5: Compare different type of mutation and chromosomal abnormalities and sex determination

Section I

Unit	Syllabus	Lectures/ Teaching Hours	Credits
Module 1	**Ultra-structure of cell organelle** Structure of prokaryotic and eukaryotic cell, Ultra structure and function of – Plasma membrane, Nucleus, Mitochondria, Golgi apparatus, Endoplasmic reticulum, Ribosomes **Introduction to Genetics** Mendel's work on transmission of traits, Genetic Variation **Mendelian Genetics and its Extension** Principles of Inheritance, Chromosome theory of inheritance, Incomplete dominance and codominance, Multiple alleles with respect to ABO, RH blood group, extra-chromosomal inheritance	**18**	02

Module 2	**Linkage, Crossing Over** Types of Linkage and mechanism of crossing over, Coupling and Repulsion theory, Cytological evidence of crossing over **Mutations** Chromosomal Mutations: Deletion, Duplication, Inversion, Translocation, Frameshift mutation, Aneuploidy and Polyploidy; Gene mutations: Induced versus Spontaneous mutations. **Sex Determination** Dosage compensation, Sex chromosomal theory of sex determination , Geneic balance theory, haploidy-diploidy mechanism, environmental sex determination	**18**	

Section II

Unit	**Syllabus**	**Lectures/ Teaching Hours**	**Credits**
Module 1	**History of Life** Major Events in History of Life, Geological time scale **Introduction to Evolutionary Theories** Lamarckism, Darwinism, Neo-Darwinism **Processes of Evolutionary Change** Organic variations; Isolating Mechanisms; Natural selection (Example: Industrial melanism); Types of natural selection (Directional, Stabilizing, Disruptive), Artificial selection	**17**	02
Module 2	**Direct Evidences of Evolution** Types of fossils, Process of Fossilization, Dating of fossils, Geiger-Muller Counter **Species Concept** Biological species concept (Advantages and	**19**	

	Limitations); Modes of speciation (Allopatric, Sympatric) **Macro-evolution** Macro-evolutionary Principles (example: Darwin's Finches) **Extinction** Mass extinction (Causes, Names of five major extinctions, K-T extinction in detail), Role of extinction in evolution		

Reference Books:

1. Gardner, E.J., Simmons, M.J., Snustad, D.P. (2008). *Principles of Genetics*. VIII Edition. Wiley 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. Russell, P. J. (2009). *Genetics- A Molecular Approach.* III Edition. Benjamin Cummings.
5. 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.
6. 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.
7. Hall, B. K. and Hallgrimsson, B. (2008). *Evolution*. IV Edition. Jones and Bartlett Publishers
8. Campbell, N. A. and Reece J. B. (2011). *Biology*. IX Edition, Pearson, Benjamin, Cummings.
9. Douglas, J. Futuyma (1997). *Evolutionary Biology*. Sinauer Associates.

B. Sc. Part – II CBCS
Semester - III Paper- III
ZOOLOGY LAB (III): DSC -1008C (Practical)
Physiology and Biochemistry
60Hours (75 lectures of 48 minutes) - Credits-02

1. Preparation of hemin and hemochromogen crystals
2. Study of permanent histological sections of mammalian pituitary, thyroid, pancreas,
   adrenal gland, testes, ovary
3. Study of permanent slides of spinal cord, duodenum, liver, lung, kidney, bone, cartilage
4. Qualitative tests to identify functional groups of carbohydrates in given solutions (Glucose, Fructose, Sucrose, Lactose)
5. Estimation of total protein in given solutions by Lowry's method.
6. Study of activity of salivary amylase under optimum conditions (pH and Temperature)

Skill Enhancement course

7. Detection of abnormal urine constituents from given sample
8. Detection of blood groups
9. Measurement of lung capacity by respirometer
10. Measurement of human blood pressure
11. Detection of bleeding and clotting time of own blood
12. Interpretation of ECG.
13. Preparation of blood smear and Differential Leukocyte Count (D.L.C) using Leishman's stain
    Erythrocyte Sedimentary Rate (E.S.R)

Reference Books:

- Textbook of Practical Physiology: By GK Pal and Pravati Pal
- Practical Physiology Record Book: By Chandrasekar
- Textbook of Practical Physiology: By D.L. Ramachandra

- "Practical Biochemistry: A Student Handbook" by G.R. Kettle and P.D. Smith
- Molecular Cloning: A Laboratory Manual" by J.

B. Sc. Part – II CBCS
Semester - IV Paper- IV
ZOOLOGY LAB (III): DSC -1008D (Practical)
Cell biology, Genetics and Evolution
60Hours (75 lectures of 48 minutes) - Credits-02

1. Demonstration of nucleus from W.B.Cs.
2. Cytological preparation of mitochondria
3. Demonstration of Barr bodies
4. To study mitosis in onion root tip
5. Isolation of DNA
6. Study of Mendelian Inheritance and gene interactions (Non Mendelian Inheritance) using suitable examples.
7. Study of Linkage, recombination using the data.
8. Study of Human Karyotypes (normal and abnormal).
9. Study of fossil evidences from plaster cast models and pictures
10. Study of homology and analogy from suitable specimens/ pictures
11. Charts: a) Phylogeny of horse with diagrams/ cut outs of limbs and teeth of horse ancestors
    b) Darwin's Finches with diagrams/ cut outs of beaks of different species
12. Study of polytene chromosome
13. Visit to Natural History Museum and submission of report

Skill Enhancement course

14. Identification and characterization of aquarium Fishes
15. Food and feeding of Aquarium fishes: Preparation and composition of formulated fish feed
16. Fish Transportation: Fish Handling, Packing and forwarding technique
17. Aquarium construction and Maintenance

Reference Books:

1. Cell Biology: Practical Manual Prestige Publishers
2. A Text Book of Cell Biology, Genetics and Evolution (with Practical): Dr. Bindu Sharma
3. Genetics: A Conceptual approach Pierce, B.A.
4. Genetics From Genes to Genomes Hartwell, L.H. et al.

EVALUATION PATTERN

Scheme of Marking: Theory

Sem.	Course Code	Marks	Evaluation	Sections	Answer Books	Standard of passing
I	DSC1008C	80	Semester wise	Two sections each of 40 marks	As per Instruction	35% (28 marks)
II	DSC1008D	80	Semester wise	Two sections each of 40 marks	As per Instruction	35% (28 marks)

Scheme of Marking: Continuous Internal Evaluation (CIE)

Sem.	Course Code	Marks	Evaluation	Sections	Answer Books	Standard of passing
I	DSC1008C	20	Concurrent	-	As per Instruction	35% (7 marks)
II	DSC1008D	20	Concurrent	-	As per Instruction	35% (7 marks)

Scheme of Marking: Practical

Sem.	Course Code	Marks	Evaluation	Sections	Standard of passing
I AND II	DSC1008C(pr)	100	Annual	As per Instruction	35%
	DSC1008D (pr)				

Nature of Question Paper

Instructions: 1) All the questions are **compulsory.**

2) Figures to the right indicate **full** marks.

3) Draw neat labeled diagrams **wherever** necessary.

Time : 3 hours **Total Marks: 80**

SECTION-I

Q.1. Choose correct alternative. **(8)**

i)

A) B) C) D)

ii)

A) B) C) D)

iii)

A) B) C) D)

iv)

A) B) C) D)

v)

A) B) C) D)

vi)

A) B) C) D)

vii)

A) B) C) D)

viii)

A) B) C) D)

Q.2. Attempt any Two. **(16)**

A)

B)

C)

Q.3. Attempt any Four **(16)**

A)

B)

C)

D)

E)

F)

SECTION-II

Q.4. Choose correct alternative. **(8)**

i)

A) B) C) D)

ii)

A) B) C) D)

iii)

A) B) C) D)

iv)

A) B) C) D)

v)

A) B) C) D)

vi)

A) B) C) D)

vii)

A) B) C) D)

viii)

A) B) C) D)

Q.5. Attempt any Two. **(16)**

A)

B)

C)

Q.6. Attempt any Four **(16)**

A)

B)

C)

D)

E)

F)