



Shri Swami Vivekanand Shikshan Sanstha's
VIVEKANAND COLLEGE, KOLHAPUR
(An Empowered Autonomous Institute)

DEPARTMENT OF ZOOLOGY
Three/Four- Years UG Programme
Department/Subject Specific Core or Major (DSC)

NEP- 3.0

**Curriculum, Teaching and
Evaluation Structure**

(As per NEP-2020 Guidelines)

for

B.Sc.-I Zoology

Semester-I & II

(Implemented from academic year 2026-27 onwards)

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Verified by

Sr. No.	Name	Designation	Signature
1	Dr. G. K. Sontakke	BoS Chairman	
2	Prof. (Dr.) A. S. Kumbhar	Dean	
3	Prof. (Dr.) C. B. Patil	NEP Nodal Officer	
4	Prof. (Dr.) C. B. Patil	Principal	

B.Sc.: Program Outcomes (POs):

PO 1: Disciplinary Knowledge: Graduates will gain in-depth understanding in their specific major or discipline, mastering the foundational principles and theories, as well as advanced concepts. Execute theoretical and practical knowledge developed from the specific curriculum.

PO 2: Problem-Solving Skills: Graduates will learn to use their knowledge to identify, analyze and solve problems related to their field of study.

PO 3: Analytical Skills: Graduates will gain the ability to collect, analyze, interpret, and apply data in a variety of contexts. They might also learn to use specialized software or equipment.

PO 4: Research Skills and Scientific Temper: Graduates might learn how to design and conduct experiments or studies, analyze results and draw conclusions. They might also learn to review and understand academic literature.

PO 5: Environment and Sustainability: Possess a sympathetic awareness of the environment while conducting research and scientific studies and focus on sustainable social development.

B.Sc. in Zoology: Program Specific Outcomes (PSOs):

PSO1: Acquire the knowledge with facts:

Understand the nature and basic concepts of animal diversity, taxonomy, cell biology, genetics applied zoology, etc and all related to zoology life sciences subjects. Students can acquire knowledge and define terms and phenomenon in Zoology

PSO2: Acquire the skills in handling scientific instruments:

Students acquires the skills in handling scientific instruments to perform various procedures to meet specific requirements utilize modern tools in Zoology. Students can identify the animal as well as understand the various phenomenon to inculcate scientific attitude and temper in the zoology.

PSO3: Develop scientific outlook with respect to Zoology:

Understand the applications of zoology in apiculture, aquaculture, agriculture and medical zoology and other fields of zoology.

PSO4: Analyze the given scientific data critically and systematically.

Students can analyze, interprets the data systematically, explain the subjects and skills of problem solving methods.

PSO5: To realize ethical moral and social values in personal and social life.

Students will contributes the knowledge for Nation building and Society welfare. Perform various techniques and also understand ethical values in zoology

Vivekanand College, Kolhapur
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Department of Zoology

NEP-3.0

Departmental Teaching and Evaluation scheme

(2026-27 onwards)

Three/Four- Years UG Programme

Department/Subject Specific Core or Major (DSC) (as per NEP-2020 Guidelines)

First Year Semester-I & II

Sr. No.	Course Abbr.	Course code	Course Name	Teaching Scheme Hours/week		Examination Scheme and Marks				Course Credits
				TH	PR	SEE	CI E	PR	Marks	
Semester-I										
1	DSC-I	3DSC03ZOO11	Animal Diversity I	2	-	30	20	-	50	2
2	DSC-II	3DSC03ZOO12	Cell Biology	2	-	30	20	-	50	2
3	VEC-I	3VEC03ZOO11	Value Education Course	2		30	20		50	2
4	DSC I ZOO-PR-I	3DSC03ZOO19	DSC Zoology Lab-1	-	4	-	-	50	50	2
5	OEC LFS-PR-I	3OEC03LFS11	Life science –I Dairy Production and Technology	-	4	-	-	50	50	2
Semester –I Total				6	8	90	60	100	250	10
Semester-II										
1	DSC -III	3DSC03ZOO21	Animal Diversity II	2	-	30	20	-	50	2
2	DSC -IV	3DSC03ZOO22	Genetics	2	-	30	20	-	50	2
3	CC -I	3CC03ZOO11	Co-curricular Course	2		30	20		50	2
4	DSC ZOO-PR- II	3DSC03ZOO29	DSC-Zoology Lab-2	-	4	-	-	50	50	2
5	OEC LFS-PR-II	3OEC03LFS22	Life science –II Basics of Hematology	-	4	-	-	50	50	2
Semester –II Total				6	8	90	60	100	250	10

Abbreviations: TH-Theory, PR-Practical, PRO- Project, SEE- Semester End Examination, CIE- Continuous Internal Examination

Note: Minimum passing for 20 marks Internal evaluation = 08 marks
Minimum passing for 30 marks Theory paper = 12 marks Minimum
passing for 50 marks Practica/VEC/CC/VSC/FP/OJT = 20 marks
Minimum passing for 100 marks = 40 marks
Minimum passing for 200 marks = 80 marks

Passing percentage for Democracy, Election and Good Governance (DEGG) and Environmental Studies papers should be 40%

Separate passing for each Head - SEE, CIE and Practicals

B. Sc. Part – I Semester -I ZOOLOGY
DSC-I: 3DSC03ZOO11: ANIMAL DIVERSITY I

Credits: 02

Theory: 30hrs.

Marks-50

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

CO1: Recall the systematic, classification and biology of animals

CO2: Compare the morphological peculiarities of animals

CO3: Classify the animals among invertebrates

CO4: Apply the knowledge for identification of animals

UNIT-1

(15 Hrs)

Importance and scope of animal diversity

Kingdom Protista- General characters and classification up to classes; locomotion in Protozoa

Phylum Porifera- General characters and classification up to classes; Canal System in Sycon

Phylum Cnidaria- General characters and classification up to classes; Polymorphism in Obelia

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

UNIT-2

(15 Hrs)

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

Phylum Annelida- General characters and classification up to classes; Metamerism in Annelida

Phylum Arthropoda- General characters and classification up to classes; Metamorphosis in insects

Phylum Mollusca- General characters and classification up to classes, Sense organ in Mollusca

Phylum Echinodermata- General characters and classification up to classes; Water-vascular system in star fish

Reference books:

- 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.

B. Sc. Part – I Semester –I ZOOLOGY
DSC-II: 3DSC03ZOO12: CELL BIOLOGY

Credits: 02

Theory: 30hrs.

Marks-50

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

CO1: Define various terms in cell biology

CO2: Explain ultra-structure and functions of cell organelles

CO3: Apply knowledge of cell biology in research

CO4: Distinguish between various cell components

UNIT-1

(15 Hrs)

Introduction-Cell as basic unit of life, Importance of Cell Biology, Structure and function of Prokaryotic (*E. coli*) and Eukaryotic cell (Animal Cell)

Plasma Membrane: Structure, chemical composition and functions of plasma membrane, Fluid mosaic model.

Ultrastructure and Functions: Mitochondria, Endoplasmic Reticulum, Golgi apparatus, Ribosomes.

Nucleus: Structure and function of Nucleus, Chromatin: Euchromatin and Heterochromatin

UNIT-2

(15 Hrs)

Structure of Nucleic acid: DNA, RNA and its types

Chromosome: Morphology, types of chromosome, Giant chromosome-polytene chromosome & Lampbrush chromosome

Cell cycle and division: Overview of cell cycle, Phases and significance of mitosis and meiosis

Cytoskeleton: Structure and organization of microtubules, microfilaments and intermediate filaments

Reference books:

- Bruce Albert. Molecular biology of the Cell. Pub. By Garland Pub. Inc. New York & London.
- Lodish Berk, Matsudaira, Kaiser, Krleger (2004). Molecular Cell biology –pub. By W.H. Freeman & Company, New York.
- Gerald carp (2005). Molecular cell biology –pu. By John Wiley & Sons.
- Avers C.J. (1986)/ latest edition) Molecular Cell Biology, Addison- Westey, Reading in Massachusettes.
- Stearns, T. & Winey, M. (1997). The Cell Center at 100 Cell 91:303-309.

B. Sc. Part – I Semester -I ZOOLOGY

DSC- PR-I : 3DSC03ZOO19: DSC ZOOLOGY LAB-1

Credits: 02

Practical: 60hrs.Marks-50

(Practical: Four lectures of 60 minutes per week per batch)

ANIMAL DIVERSITY I ZOOLOGY LAB

1. Study of the following specimens with respect to classification and morphological peculiarities
Amoeba, Paramecium, Sycon, Euplectella, Obelia, Physalia, *Taenia solium*, Male and female *Ascaris lumbricoides*, Aphrodite, *Hirudinaria*, Limulus, *Periplaneta*, Pila, Octopus, Star fish, Antedon
2. Study of the following permanent slides:
 - a. T.S. or L.S. of Sycon
 - b. T.S. of male and female *Ascaris lumbricoides*
3. Study of mouth part in cockroach/honey bee/ any insect
4. Study of life history stages of *Taenia solium*
5. Study of life cycle of *Ascaris lumbricoides*
6. Study of Microscope: Simple and Compound
7. Temporary preparation of mitotic cell division from onion root tips.
8. Temporary preparation of nucleus from W.B.Cs.
9. Extraction of DNA from given sample
10. Stained preparation of mitochondria from oral mucosa/ onion peels
11. Effect of tonicity of solutions on plasma membrane of RBCs
12. Field visit-Museum, National park, Sea shore

Dairy Production and Technology Lab

1. Understand dairy farming and its importance.
2. Compare advance technology used for dairy farming.
3. Apply knowledge for the production of dairy products.
4. Students can identify and analyzed adulteration in milk.

- Department of Zoology

B. Sc. Part – I Semester -II ZOOLOGY
DSC-III: 3DSC03ZOO21: ANIMAL DIVERSITY II

Credits: 02

Theory: 30hrs.

Marks-50

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

- CO1: Recall diversity in kingdom animalia
 - CO2: Understand classification among chordates
 - CO3: Identify and classify the chordates
 - CO4: Analyze the various adaptations in vertebrates.
-

UNIT-1

(15 Hrs)

Protochordata: General characters and Classification of Protochordata

Agnatha: General characters of Agnatha and Classification of cyclostomes up to classes

Pisces: General characters of Pisces, General characters of Chondrichthyes and Osteichthyes with examples; aquatic adaptations of fishes

Amphibia: General features and Classification up to orders; Parental care in Amphibia

UNIT-2

(15 Hrs)

Reptiles: General characters and Classification up to orders, Venomous and non-venomous snakes, Biting mechanism in snake, Types of venom and anti-venom

Aves: General characters and Classification up to orders, Flight Adaptations in birds

Mammals: General characters and classification up to subclasses; Important characters of following Eutherian orders with examples, Primates, Chiroptera and Rodentia

Reference Books:

- Adam Sedgwick (1990). A Students Text Book of Zoology, Low Price Publications, Delhi, Vol. I, II & Vol. III
- Alfred Sherwood Romer. Thomas S. Pearson 'The Vertebrate Body, Sixth edition, CBS college Publishing, Saunders College Publishing
- Colbert E.H. (2011). Evolution of the Vertebrates, Wiley Student Edition,
- Dhami and Dhami (2014). Chordate Zoology, R. Chand & Co.
- Ekambaranatha Ayyar (1982). A Manual of Zoology Vol. II, S. Vishwanathan Pvt. Ltd.
- Jordan E. L. and Verma P. S. (2013). 'Chordate Zoology' -. S. Chand Publications. Kotpal R.L. (2016). Modern Text Book of Zoology – Vertebrates, Rastogi Publications

B. Sc. Part – I Semester -II ZOOLOGY

DSC-IV 3DSC03ZOO22: GENETICS

Credits: 02

Theory: 30hrs.

Marks-50

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

CO1: Describe the basic concept of genetics

CO2: Understanding the laws and concepts of Mendelian inheritance and its extension

CO3: Apply knowledge to solve the genetic examples

CO4: Distinguish between different genetic disorders

UNIT-1

(15 Hrs)

Introduction to Genetics: Definition, scope and importance of genetics, Classical and modern concept of gene (Cistron, Muton, Recon),

Brief explanation of following terms: Alleles, Wild type, Mutant allele, Locus, Dominant and recessive trait, Homozygous and heterozygous, Genotype and phenotype, Genome

Mendelian Genetics: Mendel's law of inheritance (Law of Dominance, Segregation and Independent assortment) Monohybrid cross, Dihybrid Cross, Test cross, Back cross.

Extension of Mendelian Genetics: Chromosomal theory of inheritance, Incomplete dominance and co-dominance, Multiple alleles with respect to ABO, RH blood group, Polygenic inheritance with reference to skin colour and eye colour in man, Lethal Alleles, Concept of Pleiotropy.

UNIT-2

(15 Hrs)

Mutations: Mutagenic agents (Physical and Chemical), Chromosomal Mutations: Deletion, Duplication, Inversion, Translocation, Aneuploidy and Polyploidy

Basics of Human genetics: Autosomes and Sex chromosomes (Structure), Normal human Karyotype

Sex Determination: Sex determination in man, environmental sex determination (Bonelia)

Genetic Disorders: Causes and symptoms of genetic disorders, Sickle cell Anaemia, Phenylketonuria, Albinism, Down syndrome, Turner's Syndrome, Edward Syndrome, Klinefelter syndrome

Reference books:

- Gardner, E.J., Simmons, M.J., Snustad, D.P. (2008). Principles of Genetics. VIII Ed..Wiley India.
- Snustad, D.P., Simmons, M.J. (2009). Principles of Genetics. V Ed. John Wiley & Sons Inc.
- Klug, W.S., Cummings, M.R., Spencer, C.A. (2012). Concepts of Genetics. 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

B. Sc. Part – I Semester -II ZOOLOGY

DSC- PR-II : 3DSC03ZOO29: DSC ZOOLOGY LAB-2

Credits: 02

Practical: 60hrs.

Marks-50

(Practical: Four lectures of 60 minutes per week per batch)

1. Study of the following specimens with reference to morphological peculiarities and Classification up to orders:
Protochordata: Amphioxus Cyclostomata: Petromyzon, Myxine
2. Study of the Pisces with reference to morphological peculiarities and Classification up to orders:
Torpedo, Exocoetus, Labeo
3. Study of the Ambhibia with reference to morphological peculiarities and Classification up to orders: *Ichthyophis, Bufo*
4. Study of the Reptiles with reference to morphological peculiarities and Classification up to orders:
Draco, Chamaeleon
5. Study of the Aves with reference to morphological peculiarities and Classification up to orders:
Passer, Columba
6. Study of the Mammals with reference to morphological peculiarities and Classification up to orders: *Funambulus, Loris*
7. Characters identifying venomous and non-venomous snakes
8. Mounting of placoid/cycloid scale
9. Demonstration of Barr bodies
10. Study of Mendelian Inheritance using suitable examples.
11. Study of gene interactions (Non-Mendelian Inheritance)
12. Study of genetic disorders (with images/photographs)- Turner's syndrome, Patau's syndrome, Down syndrome

1. Remember the terms in hematology.
2. Explain composition of blood and its function
3. Apply knowledge for the production of dairy product
4. Students can identify and analyzed blood groups

1. Study of composition of blood
2. Separation of plasma/serum/ blood cells from given blood sample
3. Preparation of blood smear to study different types of blood cells
4. Total WBCs count from given blood sample
5. Total RBCs count from given blood sample
6. Detection of bleeding time of own blood
7. Detection of clotting time of own blood
8. Detection of blood groups (ABO Blood group system)
9. Estimation of haemoglobin by Sahli's haemometer
10. Study of Erythrocyte Sedimentary Rate (E.S.R)
11. Preparation of hemin crystals
12. Effect of tonicity of solutions on plasma membrane of RBCs
13. Submission of survey report- Blood group/Hb/Bleeding/Clotting time
14. Visit to the blood bank and submission of report

Evaluation Pattern

UG degree:

For Theory course:

Continuous Internal Evaluation (CIE)

Level	Semester	Activities per Semester	Marks allotted	
			4 credit	2 credit
4.5	I & II	1) Home Assignment/Tutorial	20	10
		2) Midterm test	20	10
		Total Marks	40	20
5.0	III & IV	1) Seminar/Quiz/Open Book Exam	20	10
		2) Midterm test	20	10
		Total Marks	40	20
5.5	V & VI	1) Case study/Problem solving/Book review/Group Discussion/Poster Presentation	20	10
		2) Midterm test	20	10
		Total Marks	40	20

Semester End Examination (SEE)

Level	Semester	Activities per Semester	Marks allotted	
			4 credit	2 credit
4.5	I & II	1) Theory	60	30
		Total Marks	60	30
5.0	III & IV	1) Theory	60	30
		Total Marks	60	30
5.5	V & VI	1) Theory	60	30
		Total Marks	60	30

UG Practical

Course	Experimental work	Journal assessment	Seminar/Mini Project	Total Marks
Major	45	05	-	50
OE	45	05	-	50

Nature of Question Paper

Seat No.

Ques. paper code

VIVEKANAND COLLEGE, KOLHAPUR

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B.Sc. Part- I (Zoology) (Semester-I)

Examination.....

Course Code and Name: DSC03ELE11:

Day:

Time: 1 hours 30 minutes

Date: --/--/----

Marks: 30

Instructions:

- 1) All the questions are compulsory.
- 2) Figures to the right indicate full marks.
- 3) Draw neat labelled diagrams wherever necessary.
- 4) Use of log table/calculator is allowed.

Q. 1. Select correct alternative (One mark each):

[4]

- i) _____
A) ----- B) ----- C) ----- D) -----
- ii) _____
A) ----- B) ----- C) ----- D) -----
- iii) _____
A) ----- B) ----- C) ----- D) -----
- iv) _____
A) ----- B) ----- C) ----- D) -----

Q.2. Attempt any TWO (Seven marks each):

[14]

- i)
- ii)
- iii)

Q.3. Attempt any THREE (Four marks each):

[12]

- i)
- ii)
- iii)
- iv)
- v)

Practical Skeletal Question Paper

Total Marks: 50

Q.1. Major Experiment	10 marks
Q.2. Major Experiment	10marks
Q.3. Minor Experiment	07 Marks
Q.4. Minor Experiment	07 Marks
Q5. Spotting	06 marks
Q6. Study tour, visit and viva voce, report submission or any other	05 marks
Q7. Journal	05 marks

Equivalence of Courses:

B.Sc. Part I (Semester I and II)

Sem.	Old Course			Course in NEP 3.0		
	Course code	Course Name	Credits	Course code	Course Name	Credits
I	2DSC03ZOO11	Animal Diversity I	2	3DSC03ZOO11	Animal Diversity I	2
	2DSC03ZOO12	Cell Biology	2	3DSC03ZOO12	Cell Biology	2
	2DSC03ZOO19	DSC Zoology Lab-1	2	3DSC03ZOO19	DSC Zoology Lab-1	2
II	2DSC03ZOO21	Animal Diversity II	2	3DSC03ZOO21	Animal Diversity II	2
	2DSC03ZOO22	2DSC03ZOO21	2	3DSC03ZOO22	2DSC03ZOO21	2
	2DSC03ZOO29	DSC-Zoology Lab-2	2	3DSC03ZOO29	DSC-Zoology Lab-2	2