



Karmaveer Bhaurao Patil University, Satara

**Syllabus for
B. Sc. II Zoology**

**Under
Faculty of Science and Technology
(As per NEP 2020)**

With effect from Academic Year 2025-2026

Syllabus for Bachelor of Science Part –II Zoology

1. EVALUATION STRUCTURE:

- Semester III(5.0)

Course	Course Category	Course Code	Internal Evaluation			ESE	Total Marks	Credits
			CCE-I	CCE-II	CCE-III			
Major	T	BZT 231	10	10	10	30	50	02
	T	BZT 232	10	10	10	30	50	02
	P	BZP 233	20			30	50	02
Minor	T	BZT 234	10	10	10	30	50	02
	T	BZT 235	10	10	10	30	50	02
	P	BZP 236	20			30	50	02
OE	P	BZPOE III	20			30	50	02
VSC	P	BZPVSC 1	20			30	50	02
SEC	P	BZPSEC 1	20			30	50	02
AEC I	T	BZTAEC 1	10	10	10	30	50	02
IKS II	T	BZTIKS 2	10	10	10	30	50	02
Total							550	22

Semester IV

Course	Course Category	Course Code	Internal Evaluation			ESE	Total Marks	Credits
			CCE-I	CCE-II	CCE-III			
Major	T	BZT 241	10	10	10	30	50	02
	T	BZT 242	10	10	10	30	50	02
	P	BZP 243	20			30	50	02
Minor	T	BZT 244	10	10	10	30	50	02
	T	BZT 245	10	10	10	30	50	02
	P	BZP 246	20			30	50	02
OE	P	BZPOE IV	20			30	50	02
VSC	P	BZPVSC 2	20			30	50	02
SEC	P	BZPSEC 2	20			30	50	02
AEC II	T	BZTAEC 2	10	10	10	30	50	02
VEC II	T	BZTVEC2	10	10	10	30	50	02
Total							550	22

2. STRUCTURE OF COURSE:

As per NEP-2020(2.0)

Class	Level	Sem	Subject-1 Major		Subject-2 Minor		OE	VSC	SEC	AEC	VEC	IKS-II	Total
B.SC-II	5.0		T	P	T	P	P	P	P	T	T	T	
		III	4 (2 Theory papers)	2 (1 Practical paper)	4	2	2	2	2	2	-	2	22
		IV	4 (2 Theory papers)	2 (1 Practical paper)	4	2	2	2	2	2	2	-	22

3. COURSE TITLE

1) Third Semester

Nature of the course	Course code	Name of the Course	Credit
Theory (Major)	BZT231	Animal Diversity-II	2
	BZT232	Biochemistry	2
Practical (Major)	BZP233	Practical Course-III	2
Theory (Minor)	BZT234	Public Health and Hygiene	2
	BZT235	Animal Behavior	2
Practical (Minor)	BZP236	Practical-III	2
AEC	BZTAEC 1	English for Communication Course-I	2
OEIII	BZPOE III	Astronomics	2
IKSII	BZTIKS 2	Ancient Indian Health Science	2
VSC	BZPVSC 1	Basics in Wildlife Photography	2
SEC	BZPSEC I	Pearl Culture Technician	2
		Total Credits	22

2) Fourth Semester:

Nature of the course	Course code	Name of the Course	Credit
Theory (Major)	BZT241	Reproductive Biology	2
	BZT242	Applied Zoology	2
Practical (Major)	BZP243	Practical Course-IV	2
Theory (Minor)	BZT244	Applied Zoology-I	2
	BZT245	Reproductive Behavior	2
Practical (Minor)	BZP246	Practical-IV	2
AEC	BZTAEC 2	English for Communication Course	2
OE IV	BZPOE IV	Logic	2
VEC II	BZTVEC 2	Environmental Awareness for Animal Sciences	2
VSC	BZPVSC 2	Basics in Wildlife Cinematography	2
SEC	BZPSEC 2	Dairy Product Processor	2
		Total Credit	22

4. OTHER FEATURES:

A) LIBRARY:

Reference books, Textbooks, journals and Periodicals are available in Institute and Departmental Library. (Separate reference lists are attached along with the respective course syllabus)

B) EQUIPMENT:

a) Computer, LCD projector, visualizer, smart board

b) Laboratory Equipment:

- | | |
|-------------------------------------|-----------------|
| 1. Microscope with a digital camera | 2. Hot Air Oven |
| 3. Digital weighing balance | 4. Incubator |
| 5. pH meter | 6. Refrigerator |
| 7. Microtome | 8. Autoclave |
| 9. Sphygmomanometer | |



Karmaveer Bhaurao Patil University, Satara

(A State Public University Est. u/s 3(6) of MPUA 2016)

Faculty of Science and Technology

Yashavantrao Chavan Institute of Science, Satara

Board of Studies in Zoology

Programme: B.Sc.

Semester - III

Type : Major

Marks: 50

Credits : 2

From: A. Y. 2025-26

Name of the Course: Animal Diversity-II (BZT231)

Course Objectives: Students should be able to...

- 1) understand the principles of animal classification
- 2) identify and describe the major phyla of the animal kingdom, with suitable examples.
- 3) explain distinguishing characters of Venomous and non-venomous snakes.
- 4) discuss about different characters of class mammals.

Course Outcomes: Students will be able to...

- 1) list and describe key characteristics of major animal phyla.
- 2) explain characteristics of different class.
- 3) classify animals based on their structural features and body organization.
- 4) differentiate animals belonging to the different class upto order.

Module	Title and Contents	Hrs
Module -1:	General features of Protochordates and Agnatha 1.1 Protochordates: General features & Classification with examples (Hemichordata- Balanoglossus, Urochordata- Ascidian tadpole, Cephalochordata – Amphioxus). 1.2 Agnatha: General features of Agnatha and classification of Cyclostomes (up to orders).	08
Module -2:	Pisces and Amphibia 2.1 Pisces: General features and Classification (up to order): Swim bladder, breeding and parental care in fishes. 2.2 Amphibia: General features and Classification (up to order): Neoteny and Parental care in Amphibia (Order: Anura, Apoda, Urodela) Ichthyophis.	07
Module -3:	Reptiles and Aves 3.1 Reptiles: General features and Classification (up to order): Venomous and non-venomous snakes, identification characters of venomous and non-venomous snakes, poison apparatus, biting mechanism in snakes, effect of venom, first aid treatment, venom and antivenom production. 3.2 Aves: General features and Classification (up to order): aerial adaptations in birds (morphological, anatomical and physiological).	08
Module -4:	Mammals 4.1 General features and Classification up to order: study of adaptive radiations in mammals, egg laying mammals, aquatic mammals.	07

Reference Books:-

- 1) Faiza R. Animal Diversity; Thakur Publication Pvt. Ltd, 2023.
- 2) Lal S. S. Practical Zoology. India: Rastogi Publications, 2015.
- 3) Mishra T. Animal Diversity-II; Mahaveer Publication, 2024.
- 4) Pandey B. N., Mathur V. Biology of Chordates. India: Phi Learning Pvt. Ltd, 2018.
- 5) Pawar K. R., Desai A. E., Dama L. B. and Patil R.N. A Textbook of Animal Diversity-II Nirali Prakashan, 2016.

Evaluation Pattern:

Total Marks: 50

Internal Continuous Evaluation:

- CCE -1 10 M
- CCE -2 10M
- CCE -3 10M

Note- Best two scores of CCE will be considered out of three.

End Semester Examination:

- Question -1 10M
- Question -2 20M
- Question -3 20M



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Yashavantrao Chavan Institute of Science, Satara

Board of Studies in Zoology

Programme: B.Sc.

Semester - III

Type : Major

Marks: 50

Credits : 2

From: A. Y. 2025-26

Name of the Course: Biochemistry(BZT 232)

Course Objectives: Students should be able to...

- 1) define the concept of biomolecules.
- 2) understand the structure and function of biological macromolecules and its related metabolic pathways.
- 3) remember various enzymes and determine its mechanism of action in our body.
- 4) explore metabolic pathways, their regulation, and energy production.

Course Outcomes: Students will be able to...

- 1) identify and describe the structure and roles of key biomolecules.
- 2) sketch the structure of DNA and RNA with necessary significance.
- 3) discuss about the concepts of beta oxidation pathway and transamination and deamination process.
- 4) differentiate biological significance and clinical significance of enzymes.

Module	Title and Contents	Hrs
Module -1:	Fundamentals of Biomolecules: 1.1 Concept of biomolecules and its Classification 1.2 Carbohydrates 1.3 Lipids 1.4 Proteins 1.5 Water	08
Module -2:	Nucleic acids and Carbohydrate: 2.1 DNA and RNA. Types, Structure and functions. 2.2 Carbohydrate Metabolism: Glycolysis, Krebs Cycle, Pentose Phosphate Pathway, Gluconeogenesis, Biological Significance. Metabolic disorders of Carbohydrate metabolism (<i>Diabetes mellitus</i>).	07
Module -3:	Lipid and Protein metabolism 3.1 Lipid metabolism: β oxidation of palmitic acid, Biological Significance. Lipid profile disorder (Obesity). 3.2 Protein metabolism: Transamination, Deamination and Urea Cycle, Biological Significance. Disorders of Protein Metabolism (Any two)	08
Module -4:	Enzymology 4.1 Introduction (Classification and structure), Characteristics of enzymes, 4.2 Mechanism of enzyme action, Chymotrypsin, Biological Significance of enzymes, Clinical Significance of enzymes.	07

Reference Books:-

- 1) Agrawal P. Concepts in Biochemistry with Clinical approach; CBS publisher and distributors, 2020.
- 2) David L. Nelson and Michael M. Cox. Lehninger Principles of Biochemistry: 8th Edition; MacMillan Publishing Company, 2021.
- 3) Michael M., Srivastava R and Kevin D. Clinical Biochemistry, 7th edition; Elsevier Publisher, 2023.
- 4) Satyanarayana U: Biochemistry - E-Book. India: Elsevier Health Sciences, 2017.
- 5) Verma M., Samues R. N., Singh A., Kumar A. and Sadguru P. Text book of Biochemistry and Physiology;

Krishna's Education Publishers, 2023.

Evaluation Pattern:

Total Marks: 50

Internal Continuous Evaluation:

- CCE -1 10 M
- CCE -2 10M
- CCE -3 10M

Note- Best two scores of CCE will be considered out of three.

End Semester Examination:

- Question -1 10M
- Question -2 20M
- Question -3 20M



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Board of Studies in Zoology

Programme: B.Sc.

Semester - III

Type : Major Practical

Marks: 50

Credits : 2

From: A. Y. 2025-26

Name of the Course: Major Practical III(BZP 233)

Course Objectives: Students should be able to...

- 1) understand the principles of animal classification
- 2) identify and describe the major phyla of the animal kingdom, with suitable examples
- 3) classify the biomolecules and understand the breakdown process in body.
- 4) enhance curious pattern and critical thinking.

Course Outcomes: Students will be able to...

- 1) recall the names and characteristics of major animal phyla and classes.
- 2) understand various adaptations in animals based on their habitat.
- 3) remember fundamental properties of elements, their role in formation of biomolecules and in chemical reactions within living organisms.
- 4) apply taxonomic principles to classify and categorize animals based on observation traits.

Module	Title and Contents (Any 15 practical's of the following)	Hrs
1.	Study of the following specimens with reference to morphological peculiarities and classification (upto orders): <i>Herdmania</i> , <i>Branchiostoma</i> , <i>Petromyzon</i> , <i>Sphyrna</i> , <i>Pristis</i> and <i>Torpedo</i> .	60
2.	Study of the following specimens with reference to morphological peculiarities and classification (upto orders)- <i>Labeo</i> , <i>Exocoetus</i> , <i>Anguilla</i> and <i>Uraeotyphlus</i> .	
3.	Study of the following specimens with reference to morphological peculiarities and classification (up to orders)- <i>Salamandra</i> , <i>Ichthyophis</i> , <i>Bufo</i> and <i>Hyla</i> .	
4.	Study of the following specimens with reference to morphological peculiarities and classification (up to orders)- <i>Chelone</i> , <i>Hemidactylus</i> , <i>Chamaeleo</i> , <i>Draco</i> , <i>Crocodylus</i> and <i>Gavialis</i> .	
5.	Characters identifying venomous and non-venomous snakes: <i>Daboia</i> (Russell's viper), <i>Echis</i> (Saw scaled viper), <i>Bungarus</i> (Common krait), <i>Naja</i> (Indian Cobra), <i>Ptyas</i> (Rat snake), <i>Xenochrophis</i> (checkered keel back) and <i>Eryx</i> (Sand boa).	
6.	Study of birds (from any six orders).	
7.	Study of the following specimens with reference to morphological peculiarities and classification (up to orders): <i>Sorex</i> , <i>Pipistrellus</i> , <i>Funambulus</i> and <i>Nycticebus</i> . An "Animal Album" containing photographs, cutouts with discuss write up about the above mentioned taxa. Different taxa/ topics may be given to students for this purpose.	
8.	Dissection (demonstration) of brain of fowl.	
9.	Temporary preparation of Hyoid apparatus, Sclerotic plate, Pecten of fowl.	
10.	Temporary preparation of fish scale.	
11.	Study of Desert adaptations in reptiles with suitable examples.	

12.	Qualitative tests of carbohydrates and lipid from given solutions (Glucose, Fructose, Sucrose, Lactose and Lipid).	
13.	Estimation of total protein in given solutions by Lowry's method or Bradford method/ Quantitative estimation of amino acids by using Ninhydrin reaction.	
14.	Study of activity of salivary amylase under optimum conditions.	
15.	DNA isolation from animal.	
16.	Study of Urease activity.	
17.	To extract lipids from a food sample and observe their physical properties.	
18.	Estimation of casein.	
19.	Field visit	

Reference Books:-

- 1) Adate K.J., Ajagekar V. V., Vhanalakar S.A. and Lanka L.P. : A Handbook of practical Zoology, First Edition; Bhumi Publishing, India, 2023.
- 2) Damodaran G. Practical Biochemistry ; Jaypee Brothers Ltd. Pvt. 2nd Edition, 2024.
- 3) Guyton A.C. and Hall J.E. : Textbook of Medical Physiology, XII Edition, 2017.
- 4) Mahesh K. Practical Zoology; Uttarakhand Open University, Haldwani, Nainital, 2017.
- 5) Trigunayat M.M. and Trigunayat K. A Manual of Practical Zoology: Biodiversity, Cell Biology, Genetics & Developmental Biology Part 1; Scientific Publishers, 2019.

Evaluation Pattern:

Total Marks: 50

Internal Continuous Evaluation: 20 M (Student performance, attendance, journal record and viva-voce)

End Semester Examination: 30M



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Board of Studies in Zoology

Programme: B.Sc.

Semester - III

Type : Minor

Marks: 50

Credits : 2

From: A. Y. 2025-26

Name of the Course: Public Health and Hygiene (BZT234)

Course Objectives: Students should be able to...

- 1) define concept of nutrition.
- 2) understand environmental impact on health.
- 3) classify communicable and non communicable diseases.
- 4) discuss communicable and non communicable diseases.

Course Outcomes: Student will be able to...

- 1) identify essential nutrients and their function.
- 2) understand the relationship between nutrition and health.
- 3) explain the importance of vaccination and preventive measures in maintaining public health.
- 4) evaluate the impact and effectiveness of public health interventions targeting non-communicable diseases.

Module	Title and Contents	Hrs
Module -1:	Classification and function of food: 1.1 Body building, energy yielding and protective food. 1.2 Historical perspective of nutrient requirements. 1.3 Nutritional deficiencies and disorders of Carbohydrates, Protein, Lipid, Vitamins and Minerals.	08
Module -2:	Pollution and Health Issues: Pollution and its impact on health, 2.1 Air: Indicators, effects, interventions, legislations. 2.2 Water: Pollutants, Effects, Purification of water. 2.3 Soil: Pollutants, Effects and Prevention. 2.4 Increased use of chemicals/pesticides and its impact.	07
Module -3:	Prophylaxis and treatment: Causes, Symptoms, Diagnosis, Treatment and Prevention of, 3.1 Tuberculosis 3.2 Malaria 3.3 Hepatitis-A & B 3.4 AIDS 3.5 COVID	08
Module -4:	Prophylaxis and treatment of non-communicable diseases: Causes, Symptoms, Diagnosis, Treatment and Prevention of, 4.1 Diabetes 4.2 Obesity 4.3 Coronary heart disease 4.4 Epilepsy 4.5 Cancer	07

Reference Books:-

- 1) Dass K. Public Health and Hygiene; Notion Press, 2021.
- 2) Dass K. Public Health and Hygiene; Notion Press, 2019.
- 3) Leyland A., Baum F. and Li Liming. Oxford Textbook of Global Public Health (Oxford Textbooks in Public Health), Oxford University Press, 17th Edition, 2021.
- 4) Roger W. Communicable diseases: A Global Perspective; 6th edition; CABI Publishing, 2019.
- 5) Shanmugavel G. and George B. Textbook of Public Health and Hygiene; Darshan Publishers, 2021.

Evaluation Pattern:**Total Marks: 50****Internal Continuous Evaluation:**

- CCE -1 10 M
- CCE -2 10M
- CCE -3 10M

Note- Best two scores of CCE will be considered out of three.

End Semester Examination:

- Question -1 10M
- Question -2 20M
- Question -3 20M



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Programme: B.Sc.

Semester - III

Type : Minor

Marks: 50

Credits : 2

From: A. Y. 2025-26

Name of the Course: Animal Behaviour (BZT 235)

Course Objectives: Students should be able to...

- 1) enlist the types of animal behavior.
- 2) define concept of ethology.
- 3) recall communication behavior in animals.
- 4) remember social organization in animals.

Course Outcomes: Student will be able to...

- 1) understand various types of animal behaviour.
- 2) describe the social organization of animals and explain its adaptive significance.
- 3) explain the concept of communication behaviour in animals, including its types and functions.
- 4) differentiate between various types of animal behaviour based on their characteristics and examples.

Module	Title and Contents	Hrs
Module -1:	Fundamentals of Animal Behaviour: 1.1 Introduction to Ethology 1.2 Patterns of animal Behaviour 1.2.1. Stereotyped Behaviour 1.2.2. Variable Behaviour 1.2.3. Altruism 1.3 Types of Behaviour – 1.3.1. Neural Behaviour 1.3.2. Hormonal Behaviour (Emotional and Social) 1.3.3. Aggressive and Feeding Behaviour 1.3.4. Protective Behaviour (mimicry and camouflage)	08
Module -2:	Social Behaviour: 2.1 Introduction 2.2 Schooling in Fishes 2.3 Flocking in Birds 2.4 Herding in mammals 2.5 Group selection 2.6 Kin selection 2.7 Social organization in vertebrate and invertebrate	07
Module -3:	Communication in animals : 3.1 Basic components of communication 3.2 Types of communication 3.3 Alarm calls 3.4 Dances of honey bees 3.5 By pheromones	08
Module -4:	Territorial Behaviour : 4.1 Introduction	07

	4.2 Types of territories 4.3 Size and boundary of territories 4.4 Marking of territory 4.5 Function of territoriality	
Reference Books:- 1) Agarwal V. K. Animal behaviour ethology; S. Chand and company limited, 2018. 2) Mathur R. Concepts of Animal Behaviour; Rastogi Publications; 1st Edition, 2018. 3) Mohanty M. K. Animal Behaviour and Chronobiology; Kalyan Publishers, 2022. 4) Natarajan P. and Arumugam N. Animal Behaviour; Saras Publication; 1st edition, 2018. 5) Tarkeshwar and Kapinder. Concise Book of Animal Behaviour and Chronobiology; Prestige Publishers, 2023.		
Evaluation Pattern:		
Total Marks: 50		
Internal Continuous Evaluation: • CCE -1 10 M • CCE -2 10M • CCE -3 10M Note- Best two scores of CCE will be considered out of three.	End Semester Examination: • Question -1 10M • Question -2 20M • Question -3 20M	



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Faculty of Science and Technology

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Board of Studies in Zoology

Programme: B.Sc.

Semester - III

Type Minor Practical

Marks: 50

Credits : 2

From: A. Y. 2025-26

Name of the Course: Minor Practical III (BZP 236)

Course Objectives: Students should be able to...

- 1) define concept of nutrition.
- 2) understand environmental impact on health.
- 3) classify the biomolecules and understand the breakdown process in body.
- 4) explain the characteristics, causes, and differences between communicable and non-communicable diseases.

Course Outcomes: Students will be able to...

- 1) remember essential nutrients and their function.
- 2) understand the relationship between nutrition and health.
- 3) explain the factors influencing behavioral changes in animals and describe their adaptive significance.
- 4) evaluate the effectiveness of public health programs targeting non-communicable diseases.

Module	Title and Contents	Hrs
1.	Qualitative tests of carbohydrates and lipid from given solutions (Glucose, Fructose, Sucrose, Lactose and Lipid).	60
2.	Study of qualitative tests of Protein from given solution	
3.	Study of nutritional deficiencies and disorders of vitamins.	
4.	Study of nutritional deficiencies and disorders of minerals	
5.	Study of causes, symptoms, diagnosis, treatment and prevention of COVID, Tuberculosis, AIDS, Malaria and Hepatitis-A & B	
6.	Study of causes, symptoms, diagnosis, treatment and prevention of non-communicable disease diabetes, obesity, coronary heart disease, epilepsy and cancer.	
7.	To study the types of mimicry.	
8.	Study of Camouflage.	
9.	Study of communication behaviour in honey bee.	
10.	Communication in animals: Chemical signals and sound signals.	
11.	Study of Geo-Taxis, Photo-Taxis, Hygro-Taxis In Animals.	
12.	To study the Habituation in domestic animal.	
13.	Case Study of Animal Behaviour.	
14.	Visit to Agro-based Industry.	

Reference Books:-

- 1) Dass K. Public Health and Hygiene; Notion Press, 2021.
- 2) Leyland A., Baum F. and Li Liming. Oxford Textbook of Global Public Health (Oxford Textbooks in Public

Health), Oxford University Press, 17th Edition, 2021.

3) Monika Devi N.R. Public Health and Hygiene; Iterative International Publisher IIP, 2022.

4) Parkes A. E. A Manual of Practical Hygiene; Anatiposi Verlag Publication, 2023.

5) Shanmugavel G. and George B. Textbook of Public Health and Hygiene; Darshan Publishers, 2021.

Evaluation Pattern:

Total Marks: 50

Internal Continuous Evaluation: 20M (Student performance, attendance, journal record and viva-voce)

End Semester Examination: 30M



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Board of Studies in Zoology

Programme: B.Sc.

Semester - III

Type : VSC

Marks: 50

Credits : 2

From: A. Y. 2025-26

Name of the Course: Basics in Wildlife Photography(BZPVSC 1)

Course Objectives: Students should be able to...

- 1) understand the basic principles of photography, including exposure, composition and lighting and how they apply to wildlife photography.
- 2) learn about the behaviour and habitats of various wildlife species to anticipate and capture authentic moments in the wild.
- 3) develop technical skills in using cameras, lenses and accessories specific to wildlife photography, including telephoto lenses, tripods, and remote triggers.
- 4) gain proficiency in wildlife photographs while maintaining ethical standards of image manipulation.

Course Outcomes: Students will be able to...

- 1) demonstrate proficiency in fundamental photography techniques and their application to wildlife photography contexts.
- 2) apply knowledge of wildlife behaviour and habitats to anticipate and capture compelling images of diverse species in their natural environments.
- 3) utilize camera equipment and processing techniques to produce high-quality wildlife photographs while adhering to ethical standards.
- 4) critically evaluate and reflect on one's own work and that of peers to continually improve photographic skills and artistic vision in the context of wildlife photography.

Module	Title and Contents (Any 15 practical's of the following)	Hrs
1.	Field trip to a local wildlife reserve or sanctuary to observe and photograph wildlife in their natural habitat.	60
2.	Equipment's required for wildlife.	
3.	Experiment with different camera settings to capture dynamic wildlife portraits.	
4.	Understanding Functions and features of DSLR, Detail Menu Settings of DSLR camera Conduct macro photography exercises to capture detailed shots of insects and small creatures.	
5.	Understanding Lenses, Focusing and its different methods, practice photographing birds in flight to improve tracking and focusing skills.	
6.	Practice using telephoto lenses and understanding their impact on composition and depth of field.	
7.	Explore different lighting conditions and their effects on wildlife photography during dawn, dusk and midday, Understanding concept of Light and its importance for photography (Available natural Direction of light, Types of light, Color of light, height of light).	
8.	Experiment with long exposure techniques to capture the motion of wildlife in their environment.	

9.	Understanding ISO, Shutter speed and aperture and its application.
10.	Understanding Built-in Light meters of DSLR, Exposure compensation and control color temperature, White balance controls, Filters.
11.	Photo editing workshops to enhance and retouch wildlife images using software like Adobe Lightroom or Photoshop.
12.	Collaborate with local conservation organizations to document wildlife conservation efforts and raise awareness through photography.
13.	Practice setting up and using camera traps to capture elusive wildlife species.
14.	Explore underwater photography techniques for capturing marine wildlife.
15.	Experiment with different perspectives and angles to create unique and visually engaging wildlife images.
16.	Reading of Histogram.
17.	Document a wildlife research project through photography, Focusing on a specific species or ecological phenomenon.
18.	Practice landscape photography with wildlife as a focal point to capture the relationship between animals and their environment.
19.	Explore the use of supplemental lighting techniques, such as Flash and reflectors, in wildlife photography.
20.	Create a portfolio showcasing the best wildlife photographs taken throughout the course, accompanied by reflections on the learning process and areas for improvement.

Reference Books:-

- 1) Ballard J. Secrets of the wildlife photographer: A step-by-step guide for capturing stunning wildlife photography. Amphoto Books, 2014.
- 2) Excell L. S. Wildlife photography: From snapshots to great shots. Peachpit Press, 2012.
- 3) Fish E. The complete guide to wildlife photography: 87tips. Create Space Independent Publishing Platform, 2017.
- 4) Peterson B. Understanding exposure: How to shoot great photographs with any camera (4th ed.). Amphoto Books, 2016.
- 5) Smith M.P. The photographer's guide to etiquette: Communicating with wildlife and nature. Amherst Media, 2014.

Evaluation Pattern:

Total Marks: 50

Internal Continuous Evaluation: 20M (Student performance, attendance, journal record and viva-voce)	End Semester Examination: 30M
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Faculty of Science and Technology

Yashavantrao Chavan Institute of Science, Satara

Board of Studies in Zoology

Programme: B.Sc.

Semester – III

Type : IKS

Marks: 50

Credits : 2

From: A. Y. 2025-26

Name of the Course: Ancient Indian Health Science (BZTIKS 2)

Course Objectives: Students should be able to...

- 1) recall concept of ancient medicine.
- 2) list of Pancha Mahabhuta.
- 3) describe concept of ahara.
- 4) identify preventive approaches for good health.

Course Outcomes: Student will be able to...

- 1) memorize the concept of health science in ancient India.
- 2) discuss principles and significance of health sciences as per Indian tradition.
- 3) classify concept of nutrition for good health.
- 4) implement preventive approaches in real life.

Module	Title and Contents	Hrs
Module -1:	Basic of Health Sciences from Ancient India: 1.1 Definition of Ayurveda. 1.2 Aim of Ayurveda. 1.3 Scope of Ayurveda. 1.4 Concept of Health according to Ayurveda.	08
Module -2:	Principles and Significance of Health Science as per Indian tradition: 2.1 Pancha Mahabhuta Concept. 2.2 Tridosha Concept(vata, pitta. Kapha). 2.3 Concept of Prakruti (Body Constitution) . 2.4 Concept of Vikurti. 2.5 Concept of Sapta Dhatu (Body Elements). 2.6 Concept of Mala (Waste Products). 2.7 Concept of Srotas (Body Channels). 2.8 Concept of Agni (Digestive Fire). 2.9 Concept of Koshta (Alimentary Tract).	07
Module -3:	Concept of Nutrition in Health Sciences: 3.1 Concept of Ahara as per Ancient Indian Wisdom . 3.2 The role of spices in Health Sciences. 3.3 Benefits of the Satvik Ahara.	08
Module -4:	Preventive approaches for good health: 4.1 Concept of Vihara (Lifestyle). 4.2 Dinacharya (Daily regimen). 4.3 Rithucharya (Seasonal regimen). 4.4 Sada vritta (Ethical Regimen): Rules of good conduct. 4.5 Dhamiya & Adhamiyavega (Preventive Regimens).	07

Reference Books:-

- 1) Bhisagacarya G. History of Indian Medicine: From Earliest Times to the Present, 2003.
- 2) Kanthi G. M. A Text Book of Ayurvedic human anatomy (Sharir Rachana Vigyan), 2018.

- 3) Ranade S., Deshpande R. R. and Chaubhe S. A Text Book of Kriya Sharira, 2017.
- 4) Shubha and Rao R. A Text Book of Padartha Vijnana Evam Ayurveda Itihas; Chaukhambha Orientalia, Varanasi, 2016.
- 5) Vidyashmi K. and Shrikanth P.H. Padartha Vijnana Evam Ayurveda Itihasa; Chaukhambha Orientalia, Varanasi, 2019.

Evaluation Pattern:

Total Marks: 50

Internal Continuous Evaluation:

- CCE -1 10 M
- CCE -2 10M
- CCE -3 10M

Note- Best two scores of CCE will be considered out of three.

End Semester Examination:

- Question -1 10M
- Question -2 20M
- Question -3 20M



Karmaveer Bhaurao Patil University, Satara

(A State Public University Est. u/s 3(6) of MPUA 2016)

Faculty of Science and Technology

Yashavantrao Chavan Institute of Science, Satara

Board of Studies in Zoology

Programme: B.Sc.

Semester - III

Type : SEC

Marks: 50

Credits : 2

From: A. Y. 2025-26

Name of the Course: Pearl Culture Technician (BZPSEC 1)

Course Objectives: Students should be able to...

- 1) understand the principles, techniques and technologies involved in the processing of Pearl Culture Industry.
- 2) acquire the knowledge of identification and handling of pearl producing oysters.
- 3) gain the knowledge and skills necessary to manufacturing good-quality pearl ornamentals.
- 4) start up the pearl culture farm in pond or tank.

Course Outcomes: Students will be able to...

- 1) understand the fundamental processes of pearl culture techniques.
- 2) set up a pearl culture system in pond / tanks.
- 3) start entrepreneurship on pearl culture.
- 4) learn the marketing strategies of pearl culture products

Module	Title and Contents (Any 15 practical's of the following)	Hrs
1.	Study of morphology and anatomy - Pallial complex of freshwater pearl mussel - <i>Lamellidens marginalis</i> .	60
2.	Study of morphology and anatomy - Pallial complex of marine water pearl oyster - <i>Pinctada fucata</i> .	
3.	Analyze water quality parameters - pH, temperature, salinity in pearl culture systems	
4.	Estimation of	
5.	Estimation of CO ₂	
6.	Estimation of Hardness	
7.	Study of life cycle of <i>Lamellidens marginalis</i>	
8.	Study of common species of freshwater pearl mussel used for pearl formation	
9.	Study of types of pearl - i. Natural pearl ii. Cultured pearl.	
10.	Maintenance of freshwater pearl culture unit by feeding, monitoring, the culture systems.	
11.	Study to diseases in pearl oysters	
12.	Study of predators of freshwater pearl mussel.	
13.	Study of Surgical Instrument for Pearl oyster Surgery	
14.	Pearl oyster surgery- Pre operative treatment	
15.	Pearl oyster surgery - Operative treatment	

16.	Pearl oyster surgery - Post operational treatment	
17.	Study of harvesting technique of pearl culture	
18.	Study of Value Added in pearl culture.	
19.	Compulsory visit to Pearl culture Centre / Submission of tour report and any Two products of pearl culture.	
Reference Books:-		
1) Algarswamy K. and Dharmraj S Mannual on pearl culture techniques, CMFRI Cochin,1984.		
2) Beveridge M.C.M. Cage aquaculture. Fishing News, 1987.		
3) Far A. E. Pearls. Butterworth Heinemann publications, 1986.		
4) Haws M. The basics of pearl farming: a Layman’s manual: (U.S.A). CTSA publications, 2002.		
5) Srivastava, C.B.L. Fishery Science and Indian Fisheries, 2014.		
Evaluation Pattern:		
Total Marks: 50		
Internal Continuous Evaluation: 20M	(Student performance, attendance, journal record and viva-voce)	End Semester Examination: 30M



Karmaveer Bhaurao Patil University, Satara

**Syllabus for
B. Sc. II Zoology**

**Under
Faculty of Science and Technology
(As per NEP 2020)**

With effect from Academic Year 2025-2026

Syllabus for Bachelor of Science Part –II Zoology

1. EVALUATION STRUCTURE:

- Semester III(5.0)

Course	Course Category	Course Code	Internal Evaluation			ESE	Total Marks	Credits
			CCE-I	CCE-II	CCE-III			
Major	T	BZT 231	10	10	10	30	50	02
	T	BZT 232	10	10	10	30	50	02
	P	BZP 233	20			30	50	02
Minor	T	BZT 234	10	10	10	30	50	02
	T	BZT 235	10	10	10	30	50	02
	P	BZP 236	20			30	50	02
OE	P	BZPOE III	20			30	50	02
VSC	P	BZPVSC 1	20			30	50	02
SEC	P	BZPSEC 1	20			30	50	02
AEC I	T	BZTAEC 1	10	10	10	30	50	02
IKS II	T	BZTIKS 2	10	10	10	30	50	02
Total							550	22

Semester IV

Course	Course Category	Course Code	Internal Evaluation			ESE	Total Marks	Credits
			CCE-I	CCE-II	CCE-III			
Major	T	BZT 241	10	10	10	30	50	02
	T	BZT 242	10	10	10	30	50	02
	P	BZP 243	20			30	50	02
Minor	T	BZT 244	10	10	10	30	50	02
	T	BZT 245	10	10	10	30	50	02
	P	BZP 246	20			30	50	02
OE	P	BZPOE IV	20			30	50	02
VSC	P	BZPVSC 2	20			30	50	02
SEC	P	BZPSEC 2	20			30	50	02
AEC II	T	BZTAEC 2	10	10	10	30	50	02
VEC II	T	BZTVEC2	10	10	10	30	50	02
Total							550	22

2. STRUCTURE OF COURSE:

As per NEP-2020(2.0)

Class	Level	Sem	Subject-1 Major		Subject-2 Minor		OE	VSC	SEC	AEC	VEC	IKS-II	Total
B.SC-II	5.0		T	P	T	P	P	P	P	T	T	T	
		III	4 (2 Theory papers)	2 (1 Practical paper)	4	2	2	2	2	2	-	2	22
		IV	4 (2 Theory papers)	2 (1 Practical paper)	4	2	2	2	2	2	2	-	22

3. COURSE TITLE

1) Third Semester

Nature of the course	Course code	Name of the Course	Credit
Theory (Major)	BZT231	Animal Diversity-II	2
	BZT232	Biochemistry	2
Practical (Major)	BZP233	Practical Course-III	2
Theory (Minor)	BZT234	Public Health and Hygiene	2
	BZT235	Animal Behavior	2
Practical (Minor)	BZP236	Practical-III	2
AEC	BZTAEC 1	English for Communication Course-I	2
OEIII	BZPOE III	Astronomics	2
IKSII	BZTIKS 2	Ancient Indian Health Science	2
VSC	BZPVSC 1	Basics in Wildlife Photography	2
SEC	BZPSEC I	Pearl Culture Technician	2
		Total Credits	22

2) Fourth Semester:

Nature of the course	Course code	Name of the Course	Credit
Theory (Major)	BZT241	Reproductive Biology	2
	BZT242	Applied Zoology	2
Practical (Major)	BZP243	Practical Course-IV	2
Theory (Minor)	BZT244	Applied Zoology-I	2
	BZT245	Reproductive Behavior	2
Practical (Minor)	BZP246	Practical-IV	2
AEC	BZTAEC 2	English for Communication Course	2
OE IV	BZPOE IV	Logic	2
VEC II	BZTVEC 2	Environmental Awareness for Animal Sciences	2
VSC	BZPVSC 2	Basics in Wildlife Cinematography	2
SEC	BZPSEC 2	Dairy Product Processor	2
		Total Credit	22

4. OTHER FEATURES:

A) LIBRARY:

Reference books, Textbooks, journals and Periodicals are available in Institute and Departmental Library. (Separate reference lists are attached along with the respective course syllabus)

B) EQUIPMENT:

a) Computer, LCD projector, visualizer, smart board

b) Laboratory Equipment:

- | | |
|-------------------------------------|----------------|
| 1. Microscope with a digital camera | 2.HotAir Oven |
| 3. Digital weighing balance | 4.Incubator |
| 5. pH meter | 6.Refrigerator |
| 7. Microtome | 8.Autoclave |
| 9. Sphygmomanometer | |



Karmaveer Bhaurao Patil University, Satara

(A State Public University Est. u/s 3(6) of MPUA 2016)

Faculty of Science and Technology

Yashavantrao Chavan Institute of Science, Satara

Board of Studies in Zoology

Programme: B.Sc.

Semester – IV

Type : Major

Marks: 50

Credits : 2

From: A. Y. 2025-26

Name of the Course: Reproductive Biology (BZT 241)

Course Objectives: Students should be able to...

- 1) understand reproductive system in female and detail process of pregnancy up till parturition.
- 2) remember different organs of male reproductive system and their functions.
- 3) discuss about regulation of hormones in male and females.
- 4) describe about technologies used to assist the reproductive health.

Course Outcomes: Students will be able to...

- 1) understand names of different organs present in male and female reproductive system and their functions.
- 2) remember various gonadal hormones and their regulatory mechanism.
- 3) explain the common causes of infertility in males and females.
- 4) analyze various assisted reproductive technologies according to diagnosis.

Module	Title and Contents	Hrs
Module -1:	Functional anatomy of female reproduction: 1.1 Ovary: folliculogenesis, ovulation, corpus luteum formation and regression. 1.2 Reproductive cycles in human and their regulation, changes in the female tract 1.3 Ovum transport in the fallopian tubes 1.4 Sperm movement in the female tract 1.5 fertilization 1.6 Pregnancy diagnosis 1.7 Mechanism of parturition. 1.8 Disorders of pregnancy	08
Module -2:	Anatomy of male reproduction: 2.1 Testis: Cellular functions, germ cell; Spermatogenesis; Epididymal function and sperm maturation; Accessory glands functions; Sperm transportation in male tract. 2.2 Abnormality, Prostatic hypertrophy, Causes and types of Infertility.	07
Module -3:	Gonadal hormones in male & females and their regulation: 3.1 Introduction to gonads, its functions. 3.2 Male gonad hormone- Testosterone, Inhibin, Androsterone. 3.3 Female gonad hormone – Oestrogen, Progesterone, Hormonal control of implantation, Parturition, Lactation.	07
Module -4:	Reproductive Health: 4.1 Infertility in male and female: Causes, diagnosis and management. 4.2 Assisted Reproductive Technology: Sex selection, Sperm bank and laws, frozen embryos, in-vitro fertilization, Tubal Embryo Transfer (TET), Frozen Embryo Transfer (FET), Intra Uterine Insemination (IUI), Zygote Intra Fallopian Transfer (ZIFT), Gamete Intra Fallopian Transfer (GIFT), Intra Cytoplasmic Sperm Injection, (ICSI), Contraceptive technologies. Menstrual problems, Ectopic pregnancy, Endometriosis, Ovarian Tumors, Ovarian cysts, Ovarian torsion, Polycystic ovary.	08

Reference Books:-

- 1) Arumugam N. Animal Physiology; Saras Publication; 12th edition, 2019.

- 2) Hall E. J. and Hall E. M. Guyton and Hall Textbook of Medical Physiology; Elsevier Health Science; 3rd edition, 2020.
- 3) Johnson H. M. Essential Reproduction; Wiley-Blackwell; 8th edition, 2018.
- 4) Venkatesh D. and Sudhakar H.H. Basics of Medical Physiology; Wolters Kluwer India publication; Fifth edition, 2023.
- 5) Zeleznik J. A. and Tony M. K and Neill's. Physiology of Reproduction; Academic Press; 4th edition, 2015.

Evaluation Pattern:

Total Marks: 50

Internal Continuous Evaluation:

- CCE -1 10 M
- CCE -2 10M
- CCE -3 10M

Note- Best two scores of CCE will be considered out of three.

End Semester Examination:

- Question -1 10M
- Question -2 20M
- Question -3 20M



Karmaveer Bhaurao Patil University, Satara

(A State Public University Est. u/s 3(6) of MPUA 2016)

Faculty of Science and Technology

Yashavantrao Chavan Institute of Science, Satara

Board of Studies in Zoology

Programme: B.Sc.

Semester – IV

Type : Major

Marks: 50

Credits : 2

From: A. Y. 2025-26

Name of the Course: Applied Zoology (BZT 242)

Course Objectives: Students should be able to...

- 1) remember fundamental concepts of animal biology and their applications in daily life.
- 2) recall host-parasite relationship with suitable examples.
- 3) understand economic importance of various insects causing damage to crops and stored grains.
- 4) differentiate between beneficial and harmful animals and analyze their impact on human welfare and ecosystems.

Course Outcomes: Students will be able to...

- 1) understand the scope and importance of applied zoology.
- 2) describe the role of beneficial animals.
- 3) explain techniques in pest and vector management.
- 4) demonstrate awareness of Zoonotic diseases and their control measures for public health safety.

Module	Title and Contents	Hrs
Module -1:	Introduction to Host-parasite Relationship: 1.1 Host, Definitive host, Intermediate host, Parasitism, Symbiosis, Commensalism, Reservoir, Biological Importance of Parasites, Introduction to Zoonosis Diseases.	07
Module -2:	Epidemiology of Diseases: 2.1 Transmission, Prevention and control of diseases: Tuberculosis, Herpes, Rickettsiae and Spirochaetes: Brief account of <i>Rickettsia prowazekii</i> and <i>Treponema pallidum</i> .	07
Module -3:	Insects of Economic Importance: 3.1 Beneficial insect: Silkworms, honey bees and Lac insect 3.2 Harmful insect: Pulse beetle, Rice weevil, Red rust flour beetle	08
Module -4:	Poultry and Dairy farming practices: 4.1 Poultry Farming: Indigenous and Exotic breeds, Principles of poultry breeding, Management of breeding stock and broilers, Processing and Preservation of eggs. Atomization of Poultry. 4.2 Poultry Diseases: Coccidiosis, avian Flu, Fowl pox, Botulism, Fowl chlorella 4.3 Dairy Farming: Management of model dairy farming, Common livestock diseases Nutritive value of Milk and milk products.	08

Reference Books:-

- 1) Cheruiyot D. Livestock housing: Construction details for cattle, pigs, poultry and goats (Farm management); Kindle edition, 2022.
- 2) Desai A. E., Pawar K.R. Applied Zoology 1 - Zoology Paper, Nirali Prakashan, 2020.
- 3) Kumar A. Animal Husbandry, Discovery Publishing House, 2019
- 4) Shrivastava K. P. Textbook on applied entomology. Kalyani Publishers, 2010.
- 5) Upadhyay V. B. and Shukla G. S. Applied And Economic Zoology, Rastogi Publications; First Edition, 2014.

Evaluation Pattern:

Total Marks: 50	
Internal Continuous Evaluation: • CCE -1 10 M • CCE -2 10M • CCE -3 10M Note- Best two scores of CCE will be considered out of three.	End Semester Examination: • Question -1 10M • Question -2 20M • Question -3 20M



Karmaveer Bhaurao Patil University, Satara

(A State Public University Est. u/s 3(6) of MPUA 2016)

Faculty of Science and Technology

Yashavantrao Chavan Institute of Science, Satara

Board of Studies in Zoology

Programme: B.Sc.

Semester – IV

Type : Major Practical

Marks: 50

Credits : 2

From: A. Y. 2025-26

Name of the Course: Major Practical IV (BZP 243)

Course Objectives: Students should be able to...

- 1) remember reproductive system in female and detail process of pregnancy up till parturition.
- 2) recall different organs of male reproductive system and their functions.
- 3) understand about regulation of hormones in male and females.
- 4) discuss about technologies used to assist the reproductive health.

Course Outcomes: Students will be able to...

- 1) understand the anatomical structures of male and female reproductive system.
- 2) identify the hormones involved in the regulation of the menstrual cycle.
- 3) describe the structure and function of the male and female reproductive organs.
- 4) acquired experimental knowledge of sperm count and sperm motility.

Module	Title and Contents	Hrs
1.	Study of male reproductive system and female reproductive system.	60
2.	Study of stages of estrus cycle through permanent slides	
3.	Examination of histological sections from photomicrographs/ permanent slides of male reproductive system of rat: T.S. of testis and T. S. of epididymis and T.S. of accessory glands of male reproductive system.	
4.	Examination of histological sections from photomicrographs/ permanent slides of rat: Sections of ovary, fallopian tube, uterus (proliferative and secretory stages), cervix and vagina of female reproductive system.	
5.	Sperm count and sperm motility.	
6.	Study of contraceptive devices (Photographs).	
7.	Determination of pregnancy by using kit.	
8.	Awareness regarding population explosion	
9.	Study of Invitro Fertilization (IVF) techniques.(Photographs)	
10.	Study of arthropod vectors associated with human diseases: <i>Pediculus</i> , <i>Culex</i> , <i>Anopheles</i> , <i>Aedes</i> and <i>Xenopsylla</i> .	
11.	Study of insect damage to different plant parts/stored grains through damaged Products/photographs.	
12.	Identifying feature and economic importance of Silkworms, honey bees and Lac insect.	
13.	Identifying feature and economic importance of Pulse beetle, Rice weevil and Red rust flour beetle.	

14.	Nutritive value of egg and meat.	
15.	Poultry diseases.	
16.	Nutritive value of milk.	
17.	Field visit and Submission of report.	

Reference Books:-

- 1) Hall J. E. Guyton and Hall Textbook of Medical Physiology. United Kingdom: Elsevier, 2016.
- 2) Kumar A. Animal Husbandry, Discovery Publishing House, 2019.
- 3) Mali R.P. and Afsar S. K. A Practical Manual on Innovative Animal Physiology (PB); Oxford Book Company, 2015.
- 4) Shukla S. N. and Chouksey S. Practical Manual on Basics of Reproductive Biotechnology; Taneesha Publishers, 2023.
- 5) Trigunayat M. M. A Manual of Practical Entomology; Scientific Publishers; 3rd edition, 2016.

Evaluation Pattern:

Total Marks: 50

Internal Continuous Evaluation: 20M (Student performance, attendance, journal record and viva-voce)	End Semester Examination: 30M
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Karmaveer Bhaurao Patil University, Satara

(A State Public University Est. u/s 3(6) of MPUA 2016)

Faculty of Science and Technology

Yashavantrao Chavan Institute of Science, Satara

Board of Studies in Zoology

Programme: B.Sc.

Semester – IV

Type : Minor

Marks: 50

Credits : 2

From: A. Y. 2025-26

Name of the Course: Applied Zoology-I (BZT 244)

Course Objectives: Students should be able to...

- 1) remember the concept of Applied Zoology.
- 2) understand the silk worm techniques.
- 3) identify different species of Vermiculture and Vermicomposting.
- 4) gain knowledge of future prospective of Sericulture, Vermiculture, Fisheries and Dairy farming.

Course Outcomes: Student will be able to...

- 1) recall the terminology used in Applied Zoology.
- 2) understand about methodology used in Sericulture, Vermiculture, Fisheries and Dairy farming
- 3) discuss about opportunities in the field of Applied Zoology.
- 4) analyze how sericulture, vermiculture, fisheries, and dairy farming impact the economy and ecosystem of specific regions.

Module	Title and Contents	Hrs
Module -1:	Sericulture: 1.1 Life cycle of <i>Bombyx mori</i> 1.2 Structure of Silk gland and secretion of Silk 1.3 Silk worm rearing technology 1.4 Prospects of Sericulture in India	08
Module -2:	Vermiculture: 2.1 Vermiculture and vermicomposting 2.2 Vermiculture techniques 2.3 Bedding for vermiculture 2.4 Methods of harvesting 2.5 Economic importance	07
Module -3:	Fisheries: 3.1 Habit and Habitats of Fishes. 3.2 Food, feeding and ecology. 3.3 Fishery product and biproducts. 3.4 Economic value of Fish oil, shagreen, fish glue, fish manure	08
Module -4:	Dairy farming: 4.1 Indigenous and exotic breeds of buffalo. 4.2 Scope in dairy farming 4.3 Nutritive value of milk and milk products.	07

Reference Books:-

- 1) Cheruiyot D. Livestock housing: Construction details for cattle, pigs, poultry and goats (Farm management); Kindle edition, 2022.
- 2) Desai A. E., Pawar K. R. Applied Zoology 1 - Zoology Paper, Nirali Prakashan, 2020.
- 3) Kumar A. Animal Husbandry, Discovery Publishing House, 2019.
- 4) Shrivastava K. P. Textbook on applied entomology. Kalyani Publishers, 2010.
- 5) Upadhyay V. B. and Shukla G. S. Applied and Economic Zoology, Rastogi Publications; First Edition, 2014.

Evaluation Pattern:	
Total Marks: 50	
Internal Continuous Evaluation: • CCE -1 10 M • CCE -2 10M • CCE -3 10M Note- Best two scores of CCE will be considered out of three.	End Semester Examination: • Question -1 10M • Question -2 20M • Question -3 20M



Karmaveer Bhaurao Patil University, Satara

(A State Public University Est. u/s 3(6) of MPUA 2016)

Faculty of Science and Technology

Yashavantrao Chavan Institute of Science, Satara

Board of Studies in Zoology

Programme: B.Sc.

Semester – IV

Type : Minor

Marks: 50

Credits : 2

From: A. Y. 2025-26

Name of the Course: Reproductive Behaviour (BZT245)

Course Objectives: Students should be able to...

- 1) define key term related to reproductive behavior such as mating, fertilization and sexual selection.
- 2) understand the anatomical and physiological aspects of reproductive systems in various species.
- 3) remember the differences in reproduction strategies between different species.
- 4) discuss about the hormonal regulation of reproductive behavior in mammals.

Course Outcomes: Student will be able to...

- 1) remember key terminology related to reproductive behavior such as, courtship, sexual selection and reproductive strategies.
- 2) understand reproductive behavior in different animal.
- 3) explain the different aspects of reproductive behavior, including mating systems, courtship, and parental care strategies.
- 4) apply knowledge of reproductive behavior to analyze case studies of mating and reproductive strategies in different species.

Module	Title and Contents	Hrs
Module -1:	Reproductive behaviour: 1.1 Introduction 1.2 Acquired behaviour 1.3 Innate behaviour 1.4 Analysis of behaviour (Ethogram)	07
Module -2:	Courtship behavior: 2.1 Introduction and features of courtship 2.2 Courtship behaviour in; 2.2.1. Arthropod 2.2.2. Fishes 2.2.3. Amphibia 2.2.4. Reptiles 2.2.5. Birds 2.2.6. Mammals	08
Module -3:	Bioluminescence: 3.1 Occurrence of bioluminescence 3.2 Types of bioluminescence 3.3 Role of bioluminescence in sexual behavior 3.3.1. Bioluminescence in deep sea fishes 3.3.2. Bioluminescence in insect	07
Module -4:	Biological rhythms and migration pattern: 4.1 Circadian rhythms, circa-annual rhythms in bird migration, lunar rhythms, human rhythms and biological clock. 4.2 Orientation and navigation 4.3 Migration of fishes, turtles and birds	08

Reference Books:-

- 1) Agarwal V. K. Animal behaviour ethology; S. Chand and company limited, 2018.
- 2) Mathur R. Concepts of Animal Behaviour; Rastogi Publications; 1st Edition, 2018.
- 3) Mohanty M. K. Animal Behaviour and Chronobiology; Kalyan Publishers, 2022.
- 4) Natarajan P. and Arumugam N. Animal Behaviour; Saras Publication; 1st edition, 2018.
- 5) Tarkeshwar and Kapinder. Concise Book of Animal Behaviour and Chronobiology; Prestige Publishers, 2023.

Evaluation Pattern:**Total Marks: 50****Internal Continuous Evaluation:**

- CCE -1 10 M
- CCE -2 10M
- CCE -3 10M

Note- Best two scores of CCE will be considered out of three.

End Semester Examination:

- Question -1 10M
- Question -2 20M
- Question -3 20M



Karmaveer Bhaurao Patil University, Satara

(A State Public University Est. u/s 3(6) of MPUA 2016)

Faculty of Science and Technology

Yashavantrao Chavan Institute of Science, Satara

Board of Studies in Zoology

Programme: B.Sc.

Semester – IV

Type : Minor Practical

Marks: 50

Credits : 2

From: A. Y. 2025-26

Name of the Course: Minor Practical IV (BZP246)

Course Objectives: Students should be able to...

- 1) define the concept of applied Zoology
- 2) remember silk worm techniques.
- 3) understand different species of Vermiculture and Vermicomposting.
- 4) discuss about future prospective of Sericulture, Vermiculture, Fisheries and Dairy farming.

Course Outcomes: Student will be able to...

- 1) understand the terminology used in Applied Zoology.
- 2) remember methodology used in Sericulture, Vermiculture, Fisheries and Dairy farming.
- 3) explain opportunities in the field of Applied Zoology.
- 4) analyze the economic and ecological implications of Sericulture, Vermiculture, Fisheries and dairy farming in specific regions.

Module	Title and Contents	Hrs
1.	To study life stages of <i>Bombyx mori</i> .	60
2.	To study different types of tools in cocoon rearing.	
3.	Study of silk worm rearing techniques and mulberry cultivation methods.	
4.	Study of types of earthworms used in Vermiculture-Endogeic, Epigeic, Anecic and Compost.	
5.	Study of Vermiculture techniques.	
6.	To study habit and habitat of fresh water fishes, i) Surface feeder ii) Bottom feeder	
7.	To study habit and habitat of marine water fishes, i) Surface feeder ii) Bottom feeder	
8.	Study of food and feeding habits of fresh water and marine water fishes.	
9.	Study of fish and its biproducts.	
10.	Study of nutritive value of milk and milk products.	
11.	To study nesting behaviour in insect.	
12.	Nesting behaviour in birds.	
13.	Study of courtship behaviour	
14.	Study of mechanism of bioluminescence	
15.	Disorders and treatment of biological rythams.	

16.	To Study migration in fishes.	
17.	Field visit and submission of report.	
Reference Books:- 1) Biswas K. P. Practical Manual of Fisheries; Daya Pub. House, 2018. 2) Dwarka, Ahirwar M. K., Singh D.P. Handbook of Sericulture; Genic Books Publishers,1st edition, 2024. 3) Sannigrahi A. K. Manual on Vermitechnology; New India Publishing Agency – NIPA, 2023. 4) Sarkar A. Sexual Behaviour in Animals; Discovery Publishing Pvt.Ltd; 1st edition, 2003. 5) Trigunayat M. M. A Manual of Practical Entomology; Scientific Publishers; 3rd edition, 2015.		
Evaluation Pattern:		
Total Marks: 50		
Internal Continuous Evaluation: 20M (Student performance, attendance, journal record and viva-voce)		End Semester Examination: 30M



Karmaveer Bhaurao Patil University, Satara

(A State Public University Est. u/s 3(6) of MPUA 2016)

Faculty of Science and Technology

Yashavantrao Chavan Institute of Science, Satara

Board of Studies in Zoology

Programme: B.Sc.

Semester – IV

Type : VSC

Marks: 50

Credits : 2

From: A. Y. 2025-26

Name of the Course: Basics in Wildlife Cinematography(BZPVSC 2)

Course Objectives: Students should be able to...

- 1) grasp wildlife behaviour and ecology to predict animal movements for impactful footage.
- 2) master framing, lighting, and composition to enhance visual storytelling in nature.
- 3) operate specialized gear like cameras, lenses, and drones using the latest tech.
- 4) follow ethical and conservation-focused practices to minimize impact on wildlife.

Course Outcomes: Students should be able to...

- 1) apply cinematography techniques tailored to wildlife filmmaking.
- 2) analyze wildlife behavior and ecology to anticipate and capture natural scenes.
- 3) evaluate ethical and conservation principles to ensure responsible filming.
- 4) create impactful wildlife films using storytelling and critical thinking.

Module	Title and Contents (Any 15 practical's of the following)	Hrs
1.	Field Excursion: Introduction to Wildlife Habitats and Behavior Observation	60
2.	Camera Basics: Understanding Camera Settings and Functions.	
3.	Composition Techniques: Rule of Thirds, Leading Lines, and Framing.	
4.	Lighting Techniques: Natural Light vs. Artificial Light	
5.	Camera Movement: Tracking and Panning Shots.	
6.	Telephoto Lens Techniques: Capturing Distant Wildlife	
7.	Macro Cinematography: Documenting Small Creatures and Details	
8.	Time-Lapse Photography: Recording Changes in Wildlife and Environment.	
9.	Underwater Cinematography: Exploring Aquatic Ecosystems.	
10.	Night Vision Techniques: Filming Nocturnal Wildlife.	
11.	Drone Operation: Aerial Filming of Wildlife and Landscapes.	
12.	Wildlife Documentary Filmmaking: Planning and Storyboarding.	
13.	Editing Wildlife Footage.	
14.	Sound Design: Adding Ambient Sounds and Wildlife Calls.	
15.	Remote Camera Setup: Capturing Elusive Wildlife Behavior.	
16.	Ethics Workshop: Understanding Guidelines and Best Practices.	
17.	Conservation Field Project: Documenting Threatened Species and Habitats.	
18.	Guest Speaker Sessions: Insights from Wildlife Cinematography Professionals.	

19.	Portfolio Development: Curating and Presenting Wildlife Cinematography Work.	
20.	Final Project: Wildlife Cinematography Showcase.	
Reference Books:- 1) Alton J.. Digital Cinematography. Peachpit Press, 2017. 2) Barlow C. Wildlife Photography: From Snapshots to Great Shots. Peachpit Press, 2018. 3) Ellis J. and Brian P. Cinematography: Theory and Practice. Routledge, 2020. 4) Hardy A. Wildlife Filmmaking: Looking to the Future. Springer, 2019. 5) Schenk S. The Filmmaker's Guide to Visual Effects: The Art and Techniques of VFX for Directors, Producers, Editors and Cinematographers. Routledge, 2021.		
Evaluation Pattern:		
Total Marks: 50		
Internal Continuous Evaluation: 20M (Student performance, attendance, journal record and viva-voce)		End Semester Examination: 30M



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Programme: B.Sc.

Semester - IV

Type : SEC

Marks: 50

Credits : 2

From: A. Y. 2025-26

Name of the Course: Dairy Product Processor (BZPSEC 2)

Course Objectives: Students should be able to...

- 1) understand the principles, techniques, and technologies involved in the processing of various dairy products.
- 2) acquire the knowledge of personal hygiene and food handling protocols.
- 3) gain the knowledge and skills necessary to manufacturing high-quality dairy products.
- 4) estimate the fat, protein in milk and dairy products.

Course Outcomes: Students will be able to...

- 1) recall the fundamentals of dairy processing and safety protocols.
- 2) demonstrate proficiency in the operation of dairy product processing like paneer and flavored milk.
- 3) apply proper techniques for the production of a variety of dairy products, including milk, basundi and ice cream.
- 4) analyze and troubleshoot common issues encountered during dairy processing, and develop solutions to maintain product integrity.

Module	Title and Contents (Any 15 practical's of the following)	Hrs
1.	To study the role & responsibilities and maintainance of personal hygiene, food handling hygiene of Dairy Product Processor.	60
2.	To study the raw materials and different dairy equipments used in Dairy industry.	
3.	Cleaning and sanitation/ sterilization of Dairy equipment and containers.	
4.	To study the process of collection of milk and supply chain in dairy industry.	
5.	To study the Pasteurization process of milk.	
6.	Estimation of quality of raw milk by adulteration tests.	
7.	To study the preparation process of flavored milk.	
8.	To study the preparation process of Basundi/ Khoa.	
9.	To study the preparation process of Dahi/ Buttermilk/ Butter/ Ghee.	
10.	To study the preparation process of Srikhand .	
11.	To study the Preparation process of Paneer / milk cake.	
12.	To study the preparation of the process of different types of ice Creams.	
13.	To study the preparation of Kalakand / Milk powder.	
14.	To study the preparation of Yogurt/ Kefir.	
15.	To study the preparation of Lactose free milk.	

16.	Determination of Total solids of milk.	
17.	Estimation of fat / Protien / Acidity from milk or paneer.	
18.	Estimation of Ash content from milk.	
19.	To study the disposal procedure of effluent substances of dairy industry.	
20.	Compulsory visit to Dairy Industry and submission of the report.	
Reference Books:- 1) Ananthakrishnan C.P. The technology of milk processing; 4th edition, 2013. 2) Banerjee G.C. Text Book of Animal Husbandry;Oxford,8th edition, 2019. 3) Prasad J. Principles and practices of Dairy farm; Sultan Chand and Son Publication, 2019. 4) Reddy D. V. Principles of animal nutrition and feed technology,3rd edition,2018 5) Verma, D.N. Livestock production Management in tropics, 2016 6) Dairy Process Engineering (Practical Book) - Seema Tanwar, V.D.Mudgal, K.K.Meena		
Evaluation Pattern:		
Total Marks: 50		
Internal Continuous Evaluation: 20M (Student performance, attendance, journal record and viva-voce)		End Semester Examination: 30M



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Programme: B.Sc.

Semester – IV

Type : VEC

Marks: 50

Credits : 2

From: A. Y. 2025-26

Name of the Course: Environmental Awareness for Animal Sciences (BZTVEC 2)

Course Objectives: Students should be able to...

- 1) understand the environmental issues.
- 2) remember the laws made to safeguard the environment
- 3) know importance of sustainable development
- 4) correlate knowledge of sustainable development with animal sciences

Course Outcomes: Student will be able to...

- 1) explain the causes of environmental issues
- 2) discuss concepts related to environmental laws and ethics.
- 3) discuss the sustainable development goals.
- 4) Compare and analyze the importance of animal sciences in meeting the sustainable development goals.

Module	Title and Contents	Hrs
Module -1:	Environmental issues 1.1: Pollution (Air, Water and Land) 1.2: Fresh-water overuse 1.3: Natural disasters 1.4: Fuel and Energy shortage due to overuse 1.5: Increase in wasteland 1.6: Biodiversity loss 1.7: Global warming and climate change (Causes and intensity of the problem) 1.8: Role of Zoology in creation of environmental issues.	07
Module -2:	Environmental laws and ethics 2.1: Environmental Protection Act 2.2: Wildlife Protection Act 2.3: Forest Conservation Act 2.4: Prevention and control pollution Act (Air, Water and Land) from unsustainable to sustainable development 2.5: Responsibilities of an Environmentally aware citizen	08
Module -3:	Sustainable Development Goals 3.1: Introduction to Sustainable Development 3.2: Environmental Threats 3.3: Introduction to 17 global sustainable goals	08
Module -4:	Role of Animal Sciences in meeting the suitable development goals. 4.1: Examples and case studies	07

Reference Books:-

- 1) 1. Shastri S.C.: Environmental Laws; Eastern Book Company Pvt. Ltd; Seventh edition. 2022
- 2) Erach Bharucha : Textbook of Environmental Studies for undergraduate courses; 3rd edition, UGC, University press, 2021.

- 3)Tripathi S.C.: Environmental Law; Central Law Publications, 2019
 4) Mahua Basu, S. Xavier : Fundamentals of Environmental Studies, Cambridge, 2017
 5) Y. K. Shingh: Environmental Science; New Age International Publishers, 2006

Evaluation Pattern:

Total Marks: 50

Internal Continuous Evaluation:

- CCE -1 10 M
- CCE -2 10M
- CCE -3 10M

Note- Best two scores of CCE will be considered out of three.

End Semester Examination:

- Question -1 10M
- Question -2 20M
- Question -3 20M