



B.Sc. – ZOOLOGY
SEMESTER - V
US05MAZOO01 (T)

Effective from June 2026

Course Code	US05MAZOO01 [T]	Title of the Course	GENETICS
Total Credits of the Course	04	Hours per Week	04
Course Objectives:	To make students familiar with: • Scope and importance of Genetics • The course is designed to revise basic concepts of Genetics and then move on to advanced concepts. • Some key aspects include the mechanism of inheritance, gene linkage, Crossing over, Mutation, sex chromosomal and autosomal anomalies, aspects of human genetics. • Molecular genetics etc. will be covered.		

Course Content		
Unit	Description	Weightage* (%)
1.	Introduction: Definition, scope, branches and application of genetics Chromosomes: Viral genome, Prokaryotic Chromosome, Eukaryotic Chromosome, Karyotype-Idiogram, Material of Chromosomes, Special types of Chromosomes. Cell Division: Cell cycle, Mitosis, Types of meiosis, Genetics significance of Meiosis	25%
2.	Mendel and his work: Phenomenon, mechanism, variation in Dominance relation - Monohybrid cross, Law of segregation, Modification of phenotypic ratio, Lethal genes, Law of independent assortment : Dihybrid cross, back cross, test cross Gene interaction: Kinds of Epistatic & Non-Epistatic interaction	25%
3.	Gene linkage : Definition, Kinds of Linkage, Linkage groups, significance of Linkage Crossing over : Characteristics, types, mechanism and kinds of crossing over	25%

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Syllabus effective from the Academic Year 2026-2027



	Sex linked inheritance: Inheritance of X-linked genes, Y-linked genes, X-Y-linked genes, Sex linked lethal, sex influenced genes & Sex-limited genes.	
4.	Cytoplasmic or Extra nuclear inheritance: Kappa particle in paramecium, Shell coiling in Limnea , Mitochondrial & Chloroplast DNA Mutation: Meaning of Mutations, Characteristics of Mutations, Classification of Mutations, Agents of Mutations, Detections of Mutations, Nature of mutation Human genetics: pedigree analysis, amniocentesis, twins, disorders due to Mutant genes. Eugenics: positive and negative Eugenics, Euthenics , Euphenics	25%

Teaching-Learning Methodology	• Class room interactions • By chalk –duster method • By using OHP- Power point presentation • By giving Students seminar, unit test, assignment • Question bank circulation • Arranging guest talk
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Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Marks-Exam Pattern: Class test-15marks (30%), Quiz-15marks (30%), Active learning-5marks (10%),Home assignment-5marks(10%), Class assignment-5marks(10%),Attendance-5marks (10%) Total 50marks	50%
2.	External Marks (10marks MCQs + 10marks descriptive Questions From each 4- unit) Total 50 marks	50%

Course Outcomes:	
1.	Apply the principles of Mendelian inheritance.
2.	Understand how DNA encodes genetic information and the function of mRNA and tRNA



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3.	Biosynthesis of Protein
4.	Learnt about Human genetics.

Suggested Reference Books:

Sr. No.	Reference Books
1.	Genetics: P S Verma & V.K. Agarwal.
2.	Genetics: M .P .Arora.
3.	Molecular biology and Genetics engineering: P. K. Gupta.

On-line resources

ePathshala

<https://www.biologydiscussion.com/zoology/>

<https://www.slideshare.net/>

B.Sc. – ZOOLOGY

SEMESTER - V

US05MAZOO02 (T)

Effective from June 2026

Course Code	US05MAZOO02 [T]	Title of the Course	Ecology and Animal Behaviour
Total Credits of the Course	04	Hours per Week	04
Course Objectives	• To Provide Details Studies of Ecology, Biodiversity, behaviour and Chronology		

Course Content



Unit	Description	Weightage* (%)
1.	Community Ecology: General features of community Species richness, Dominance, Diversity, Abundance, Types of Stratification, Ecotone and edge effect. Ecological Niches: Parameters of the niches, Parallel niches, Niche separation, Niche overlap Ecological Succession: Characteristics & General process of Succession, Types of succession, Rate and causes of succession.	25%
2.	Biodiversity: Measuring species diversity, Importance & Benefits of Biodiversity, Loss of Biodiversity, Natural Biodiversity, Threatened of Biodiversity, Endangered species management. Biodiversity Hotspots Major anthropogenic Global environmental problems: • Eutrophication • Global warming & greenhouse effect • Global ozone problems-[Ozone depletion-causes & effects] • Acid rain • Soil erosion, Impacts of soil erosion,	25%
3.	Animal Behaviour: Introduction, Methods of studying behaviour: Naturalistic, Experimental, Statistical Types of innate & types of learnt behaviour Reproductive behaviour: Introduction, Type of fertilization, Characteristics of courtship Attention and courtship: Visual, Sound, Light, Tactile, Courtship in Stickle back fish. Mating strategies: Monogamy, polygamy and polyandry.	25%
4.	Role of pheromones in behaviour: Definition, types, production, mode of action, difference between pheromones and hormones. Chronobiology: Biological clock and Biological Rhythm Circadian Rhythm, Circannual Rhythm, Lunar Rhythm, Tidally Rhythm, Photoperiod and regulation of Seasonal reproduction of Vertebrate, Role of Melatonin Chronopharmacology	25%
Teaching-	• Class room interactions	



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Learning Methodology	• By chalk –duster method • By using OHP- Power point presentation • By giving Students seminar, unit test, assignment • Question bank circulation • Arranging guest talk
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Evaluation Pattern

Sr. No.	Details of the Evaluation	Weightage
1.	Internal Marks-Exam Pattern: Class test-15marks (30%), Quiz-15marks (30%), Active learning-5marks (10%),Home assignment-5marks(10%), Class assignment-5marks(10%),Attendance-5marks(10%) Total 50marks	50%
2.	External Marks (10marks MCQs + 10marks descriptive Questions From each 4- unit) Total 50 marks	50%

Course Outcomes:

1.	To learn about Deferent Ecosystems, Biodiversity and Behaviours
2.	To learn about different methods of Animal behaviour, Types of animal behaviour and Biological Clock
3.	Learn about chronopharmacology and it's importance in Human life.

Suggested Reference Books:

Sr. No.	Reference Books
1.	Ecology & Environment: P.D.Sharma
2.	Ecology: Mohan P. Arora
3	Environmental Science-S.C.Santra



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4	Environmental biology: P.S.Verma & V.K.Agrawal
5	Animal behavior: Reena mathur
6	Text Book of Animal Behaviour: Fatik Baran Mandal
7	Zoology for IAS: Satguru Prasad

On-line resources
https://byjus.com/free-ias-prep/biodiversity/
https://www.biologydiscussion.com/zoology/
https://www.slideshare.net/

B.Sc. ZOOLOGY

SEMESTER -V

US05MAZOO03, PRACTICAL

Effective from June 2026

Course Code	US05MAZOO03 [P]	Title of the Course	ZOOLOGY PRACTICAL
Total Credits of the Course	04	Hours per Week	08

Course Content		
PART	PRACTICALS	Weightage* (%)
1.	- Study of mitosis by Squash preparation of onion root tip. - Study of meiosis from grass hopper testis. - Mounting of giant chromosomes from chironomous larva. - Study of different characteristics of drosophila. - Study of structural chromosome aberrations (dicentric, ring chromosomes and inversions in polytene chromosomes) from prepared slides/photographs	50%



	• Study of human karyotypes and numerical alterations (Down syndrome, Klinefelter syndrome and Turner syndrome) • Genetics problems. • Demonstration of isolation of DNA from tissue. • Visit to SICART	
2.	• Soil analysis • Water analysis: Dissolved oxygen, Chloride content, Acidity & alkalinity • To study community by quadrat method. • To study the Chemical communication in ants. • To study the Nests and nesting habits of the birds and social insects • To study geotaxis behaviour in earthworm. • To study the phototaxis behaviour in insect larvae. • Study of circadian functions in humans (daily eating, sleep and temperature patterns). • Visit to Forest/ Wild life Sanctuary/Biodiversity Park/ Zoological Park to study behavioural activities of animals and prepare a short report	50%

Teaching-Learning Methodology	• Using student's Microscope • Observation of specimens • Using certain chemicals for test • Learn through chart /Model/ Video/ PPTs • Field visit, Project submission • Preparing journal through various diagrams & description
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Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Examination evaluation includes Lab Work Assignment-20 marks (40%), Viva-voce- 10marks & Lab Quiz-10 marks (40%), Journal certification- 6 marks & Attendance-active participation- 4 marks(20%)which makes total 50 Marks.	50%
2.	External Examination Evaluation includes Lab work Assignment-40 marks (80%), Viva-voce/Lab Quiz-10marks (20%), which makes total 50 Marks.	50%

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1.	Part-1: To learn Mitosis and Meiosis stages from relevant organisms and Genetic preparations
2.	Part-2: To learn about water & soil characteristics, Quadrant method and Animal Behaviour studies.

Suggested Reference Books:

Sr. No.	Reference Books
1.	Environmental biology: P.S.Verma & V.K.Agrawal
2.	Ecology & Environment: P.D.Sharma
3	Animal behavior: Reena mathur

On-line resources

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B.Sc. MINOR ZOOLOGY**SEMESTER - V****US05MIZOO01 (T)****Effective from June 2026**

Course Code	US05MIZOO01 [T]	Title of the Course	ENVIRONMENTAL BIOLOGY
Total Credits of the Course	02	Hours per Week	02
Course Objectives:	To make students familiar with: To aware the students about different Human diseases & Mechanism of Immune system.		



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Course Content				
Unit	Description	Weightage* (%)		
1.	Health and Environment: Human diseases, Climate change & Human health, Vector borne diseases, Metal toxicity, Radiation damage, Mechanisms of the Immune system- Antigen & Antibody, Antigen-Antibody Reaction, Hypersensitivity, Autoimmunity, Allergy- Allergic Rhinitis[Hay fever], Pollen and their Allergens, Asthma, Ingestant allergy, Dermatitis.	50%		
2.	Major anthropogenic Global environmental problems: • Global warming & greenhouse effect • Global ozone problems-[Ozone depletion-causes & effects] • Acid rain • Soil erosion, Impacts of soil erosion • Environmental impacts of Agriculture, The failure of green revolution, Impact of modernisation in Agriculture	50%		
<table><tr><td>Teaching-Learning Methodology</td><td> • Class room interactions • By chalk –duster method • By using OHP- Powerpoint presentation • By giving Students seminar, unit test, assignment • Question bank circulation • Arranging guest talk </td></tr></table>			Teaching-Learning Methodology	• Class room interactions • By chalk –duster method • By using OHP- Powerpoint presentation • By giving Students seminar, unit test, assignment • Question bank circulation • Arranging guest talk
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Evaluation Pattern				
Sr. No.	Details of the Evaluation	Weightage		
1.	Internal Examination Evaluation includes Class test-10 marks(40%), Quiz -5 marks(20%), Home assignment-5 marks (20%), Attendance-5 marks(10%) which makes total 25 marks	50%		
2.	External Examination [MCQs (5marks from all units) + Descriptive Questions(10 marks from each unit) total -25marks	50%		



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Course Outcomes:

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| 1. | Students learned & understand about Human diseases and taking preventive Care of it. |
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Suggested Reference Books:

Sr. No.	Reference Books
1.	Ecology & Environment: P. D. Sharma
2.	Environmental biology: P. S. Verma & V. K. Agrawal
3.	Environmental Science-S. C. Santra
4.	Ecology: Mohan P. Arora

On-line resources

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B.Sc. MINOR ZOOLOGY

V- SEMESTER PRACTICAL

US05MIZOO02

Effective from June 2026

Course Code	US05MIZOO02 [P]	Title of the Course	ZOOLOGY PRACTICAL
Total Credits of the Course	02	Hours per Week	04
Course Objectives:	To Provide Hands on Practical experience to the students		

Course Content



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	PRACTICALS	Weightage* (%)
	- Malaria- Signet ring stage, Entamoeba histolytica, Anopheles and Culex mosquitoes, Ascaris, Filarial worm, Trypanosoma, Leishmania, Guinea worm - Widal Test for Typhoid[Antigen-antibody reaction] - Study of the pollen grains of different plants. - Visit to Hospital and preparing the report. - To study abiotic components.[pH , turbidity, Temperature and light intensity] - Soil analysis - Water analysis: Dissolved oxygen, Chloride content, Water - Acidity & alkalinity	

Teaching-Learning Methodology	- Using student's Microscope - By qualitative analysis of different food. - Learn through Video/ ppt - Field visit, Project submission
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Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Examination Evaluation includes--Lab work Assignment-10marks (40%), Viva-voce & Lab quiz-10 marks(40%), Journal certification-3marks & Attendance- active participation-2marks (20%) which makes total 25 marks	50%
2.	External Examination Evaluation includes- --Lab work Assignment-10marks (40%), Viva-voce/Lab quiz-10 marks(40%), Attendance-5marks (20%) which makes total 25 marks	50%

Course Outcomes:	
1.	To learn about Human diseases and taking preventive care of it.
2.	Know about different components of soil and water



Suggested Reference Books:

Sr. No.	Reference Books
1.	Ecology & Environment: P. D. Sharma

B.Sc. MINOR ZOOLOGY

SEMESTER- V

US05MIZOO03 (T)

Effective from June 2026

Course Code	US05MIZOO03 [T]	Title of the Course	PHYSIOLOGY
Total Credits of the Course	02	Hours per Week	02
Course Objectives:	To provide exposure to histology, Physiology and related abnormalities.		

Course Content		
Unit	Description	Weightage(%)
1.	RESPIRATION: • Respiratory Organs • Pulmonary Ventilation • Lung Volumes & Capacity • Transportation of Gases • Regulation of Respiration • Disorders: Asthma, Cystic fibrosis, Emphysema, Pneumonia, Bronchitis, Tuberculosis	50%
2.	Human Urinary system: • Structure of kidney, Renal physiology (Glomerular filtration, Tubular reabsorption and tubular secretion in brief), • Production of dilute and concentrated urine (counter current	50%



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	system) Urine transportation, • Storage and elimination. Disorders: Polycystic kidney disease, urinary tract infection and renal failure	
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Teaching-Learning Methodology	• Class room interactions • By chalk –duster method • By using OHP- Powerpoint presentation • By giving Students seminar, unit test, assignment • Question bank circulation • Arranging guest talk
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Evaluation Pattern

Sr. No.	Details of the Evaluation	Weightage
1.	Internal Examination Evaluation includes Class test-10 marks(40%), Quiz -5 marks(20%), Home assignment-5 marks (20%), Attendance-5 marks(10%) which makes total 25 marks	50%
2.	External Examination [MCQs (5marks from all units) + Descriptive Questions(10 marks from each unit) total -25marks	50%

Course Outcomes:

	The students will learn about detail physiology of Respiratory and Excretory system and related disorders
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Suggested Reference Books:

Sr. No.	Reference Books
1.	A text book of animal physiology - A. K. Berry
2.	Principles of anatomy and physiology- Gerard J Tortora & Bryan Derrickson



3.	Animal physiology – M.P.Arora
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On-line resources
https://www.biologydiscussion.com/zoology/
https://www.slideshare.net/

B.Sc. MINOR ZOOLOGY

SEMESTER –V, PRACTICAL

US05MIZOO04

Effective from June 2026

Course Code	US05MIZOO04 [P]	Title of the Course	ZOOLOGY PRACTICAL
Total Credits of the Course	02	Hours per Week	04
Course Objectives	To provide exposure to histology, Physiology and related abnormalities.		

Course Content		
	PRACTICALS	Weightage* (%)
	- Mammalian Histology: T.S of lung, Trachea, Alveoli, Kidney, Artery, Vein & Capillaries - Effects of osmotic pressure on Human R.B.Cs. - Estimation of Haemoglobin. - Physical properties and examination of Urine. - Qualitative Analysis of urine for Inorganic and organic constituents. - Qualitative Analysis of urine for Pathological constituents of clinical importance.	

Teaching-Learning	- Using student's Microscope - By qualitative analysis of different food.
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Methodology	• Learn through Video/ ppt • Field visit, Project submission
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Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Examination Evaluation includes--Lab work Assignment-10marks (40%), Viva-voce- & Lab quiz-10 marks(40%), Journal certification-3marks & Attendance- active participation-2marks (20%) which makes total 25 marks	50%
2.	External Examination Evaluation includes- --Lab work Assignment-10marks (40%), Viva-voce/Lab quiz-10 marks(40%), Attendance-5marks (20%) which makes total 25 marks	50%

Course Outcomes:	
1.	The students will learn about identifying Respiratory and Excretory system related disorders by performing different practicals.

Suggested Reference Books:	
Sr. No.	Reference Books
1.	Practical Physiology, Anatomy & Biochemistry by SHAH, PATEL & GOEL

On-line resources	
https://www.biologydiscussion.com/zoology/	
https://www.slideshare.net/	



B.Sc. SKILL ENHANCEMENT ZOOLOGY

SEMESTER - V

US05SEZOO01 (T)

Effective from June 2026

Course Code	US05SEZOO01 [T]	Title of the Course	Animal Rescue, care and Rehabilitation
Total Credits of the Course	02	Hours per Week	02
Course Objectives:	• To aware the students- • How to assess animals and identify symptoms and causes of distress • Show you how to safely handle, restrain, transport, and release wildlife • Show you exactly what a wildlife rehabilitator does in their day to day work		

Course Content		
Unit	Description	Weightage* (%)
1.	Principles of capture, handling and transportation Telephone advice to the general public Wildlife capture and handling Health and Safety Legal considerations Care and Hand-rearing of young wild animals Considerations for rearing wildlife casualties Rearing juvenile mammals Rearing neonatal birds	50%
2.	Rehabilitations and Release Management during rehabilitation Pre-release assessment Release Post-release monitoring Licences for release and post release monitoring	50%



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Teaching-Learning Methodology	• Class room interactions • By chalk –duster method • By using OHP- Powerpoint presentation • By giving Students seminar, unit test, assignment • Question bank circulation • Arranging guest talk
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Evaluation Pattern

Sr. No.	Details of the Evaluation	Weightage
1.	Internal Examination Evaluation includes Class test-10 marks(40%), Quiz -5 marks(20%), Home assignment-5 marks (20%), Attendance-5 marks(10%) which makes total 25 marks	50%
2.	External Examination [MCQs (5marks from all units) + Descriptive Questions(10 marks from each unit) total -25marks	50%

Course Outcomes:

1	Students will be able to identify animals in distress and know when to step in.
2	Students will be able to treat common injuries such as broken limbs and wings and rearing them. Students will learn what they can do to assist in the community.

Suggested Reference Books:

Sr. No.	Reference Books
1.	Wildlife Rescue Handbook: The first 24 hours- Foundation for National Parks & Wild life
2.	MINIMUM STANDARDS FOR WILDLIFE REHABILITATION Fourth Edition, 2012, - Erica A. Miller, DVM
3.	BSAVA Manual of Wildlife Casualties- Second Edition- Elizabeth Mullineaux and Emma Keeble