

“Dissemination of Education for Knowledge, Science and Culture”

-Shikshanmaharshi Dr. Bapuji Salunkhe


**Shri Swami Vivekanand Shikshan Sanstha's  
Vivekanand College, Kolhapur  
(An Empowered Autonomous Institute)  
Department of Zoology  
Academic year: 2024-25**

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## **Annual Teaching Report (Term II)**

- 10. Dr. G. K. Sontakke**
- 11. Dr. T. C. Gaupale**
- 12. Dr. S. S. Desai**
- 13. Mr. G. H. Fadake**
- 14. Ms. N. A. Patel**
- 15. Dr. T. C. Patil**
- 16. Ms. P. S. Shetfalkar**
- 17. Ms. N. A. Jadhav**
- 18. Ms. P. R. Gaikwad**



  
**Dr. G. K. Sontakke**  
**HEAD**  
**DEPARTMENT OF ZOOLOGY**  
**VIVEKANAND COLLEGE, KOLHAPUR**  
**(EMPOWERED AUTONOMOUS)**

**Annual Teaching Plan**

**Name of the Teacher: Dr. G. K. Sontakke**

**Term: II**

**Class: B.Sc. II Minor (Theory)**

**Name of the Paper: Paper VII, Tools and Techniques in Biology (MIN03ZOO41)**

Month	Module unit	Sub unit
December 2024	UNIT-II	Elements of Microtomy: Pre-microtomy process, ,
January 2025	UNIT-II	Microtomy process
February 2025	UNIT-II	Post-microtomy process, Rotary Microtome
March 2025	UNIT- II	Types of Stain, Methods of staining and mounting.

**Class: B. Sc. III (Theory)**

**Name of the Paper: Paper- XVI, Aquatic Biology (DSE-1008F)**

Month	Module unit	Sub unit
December 2024	UNIT-II	Marine Biology Introduction of marine ecosystem: Structure & zonation of sea & ocean
January 2025	UNIT-II	Physico-chemical properties of seawater- salinity, density, viscosity, surface tension, concept of chlorinity and salinity of sea water.
February 2025	UNIT-II	Coral & coral reefs: Types & economic importance
March 2025	UNIT- II	Continental shelf, adaptations of deep sea organisms.

**Class: B.Sc. I (PR)****Practical: Zoology Lab (1): 2DSC03ZOO19 (Practical I)**

Month	Practical
December 2024	<ol style="list-style-type: none"> <li>1. Study of the following specimens with reference to morphological peculiarities and Classification up to orders: Protochordata: Amphioxus Cyclostomata: Petromyzon, Myxine</li> <li>2. Study of the Pisces with reference to morphological peculiarities and Classification up to orders: Torpedo, Exocoetus, Labeo</li> <li>3. Study of the Ambhibia with reference to morphological peculiarities and Classification up to orders: Ichthyophis, Bufo</li> <li>4. Study of the Reptiles with reference to morphological peculiarities and Classification up to orders: Draco, Chamaeleon</li> </ol>
January 2025	<ol style="list-style-type: none"> <li>5. Study of the Aves with reference to morphological peculiarities and Classification up to orders: Passer, Columba</li> <li>6. Study of the Mammals with reference to morphological peculiarities and Classification up to orders: Funambulus, Loris</li> <li>7. Characters identifying venomous and non-venomous snakes</li> <li>8. Study of any six common birds from different orders with the help of photographs and keys.</li> <li>9. Mounting of placoid/cycloid scale</li> </ol>
February 2025	<ol style="list-style-type: none"> <li>10. Demonstration of Barr bodies</li> <li>11. Study of Mendelian Inheritance using suitable examples.</li> <li>12. Study of gene interactions (Non-Mendelian Inheritance)</li> <li>13. Study of Human Karyotypes (normal and abnormal)</li> <li>14. Study of polytene chromosome</li> </ol>
March 2025	<ol style="list-style-type: none"> <li>15. Study of Sex determination in Drosophila</li> <li>16. Examples based on pedigree analysis</li> <li>17. Study of genetic disorders (with images/photographs) Turner's syndrome, Patau's syndrome, Down syndrome</li> </ol>

**Class: B.Sc. II (PR)****Practical: VSC03ZOO39**

Month	Practical
December 2024	<ol style="list-style-type: none"> <li>1. To study the anatomy of the fin fishes.</li> <li>2. To study the digestive and reproductive system of fin fishes</li> <li>3. Mounting of placoid and cycloid scales</li> <li>4. To study the induced breeding in fishes</li> </ol>
January 2025	<ol style="list-style-type: none"> <li>5. Identification of commercially important fin fishes</li> <li>6. Identification of commercially important shell fishes</li> <li>7. Estimation of carbonate and bicarbonate in water samples</li> <li>8. Estimation of chloride from water samples.</li> <li>9. Estimation of ammonia from water samples</li> </ol>
February 2025	<ol style="list-style-type: none"> <li>10. Methods of quality assessment to examine the freshness of fish.</li> <li>11. Maintenance of collected fishes/ Preservation techniques</li> <li>12. Method of Transportation of Fish Seeds</li> </ol>
March 2025	<ol style="list-style-type: none"> <li>13. Study of Fish by-products</li> <li>14. Modern Crafts and Gears.</li> <li>15. Estimation of muscle protein in fish by Biuret method.</li> </ol>



**Class: B.Sc. III (PR)**

**Practical: Practical-VIII (Based on Paper No. XV & XVI)**

Month	Practical
December 2024	1. Determination alkalinity of given water sample 2. Determination total hardness of given water sample
January 2025	3. Determination of chloride from given water sample 4. Study of ecological pyramids
February 2025	5. Study of coral reefs (model) 6. Report on a visit to a Sewage treatment plant/Marine bio reserve/ Fisheries Institutes



**Dr. G. K. Sontakke**



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**Vivekanand College, Kolhapur (An Empowered Autonomous Institute)**

**Department of Zoology**

**Academic year: 2024-2025**

**Teaching Plan**

**Name of the Teacher: Dr. T.C. Gaupale**

**Term: II**

**Class: B.Sc. II (Theory)**

**Name of the Paper: Principles of Biochemistry  
(DSC03ZOO41), Paper- VII**

Month	Module unit	Subunit Completed
January -2025	UNIT- II	<b>Protein metabolism</b> Amino acids- Structure, Essential and non-essential amino acids, Protein Structure (Primary, Secondary,
February -2025	UNIT- II	Tertiary and Quaternary), Transamination, Deamination and Urea Cycle
March -2025	UNIT- II	<b>Enzymes</b> Definition, Properties, Nomenclature and classification of enzymes,
April-2025	UNIT- II	Mechanism of action of enzymes (Induced fit model & Lock and key model), Factors affecting enzyme activity, Inhibition and Regulation of enzyme action

**Class: B. Sc. III (Theory)**

**Name of the Paper: Paper- XII, Developmental Biology II (DSE -1008E4)**

Month	Module unit	Subunit Completed
December 2024	UNIT-I	<b>Overview of Immune system 15</b> Introduction to basic concepts in immunology, components of immune system.
January - 2025	UNIT-I	Types of immunity- Innate immunity (physical, physiological, cellular and cytokine barrier) and adaptive immunity- features of adaptive immunity, active: artificial and natural immunity, passive: artificial and natural immunity
February - 2025	UNIT-I	Haematopoiesis Cells in immune system- Lymphoid cells (B lymphocytes, T- lymphocytes), natural killer cells (NK cells), phagocytes, granulocytic cells- neutrophils, eosinophils, basophils, mast cells.
March - 2025	UNIT- I	Organs of immune system- Primary lymphoid organ- bone marrow, thymus, bursa of fabricius. Secondary lymphoid organ- lymph node, spleen, mucosal associated lymphoid tissue (MALT), tonsils, gut associated lymphoid tissue (GALT)



**Class: B.Sc. I (PR)****Practical: ZOOLOGY LAB (1): 2DSC03ZOO19 (Practical I)**

Month	Practical Completed
Dec- 2024	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
Jan 2024	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. Study of any six common birds from different orders with the help of photographs and keys
Feb 2024	9. Mounting of placoid/cycloid scale 10. Demonstration of Barr bodies 11. Study of Mendelian Inheritance using suitable examples. 12. Study of gene interactions (Non-Mendelian Inheritance) 13. Study of Human Karyotypes (normal and abnormal)
March 2024	14. Study of polytene chromosome 15. Study of Sex determination in Drosophila 16. Examples based on pedigree analysis 18. Study of genetic disorders (with images/photographs) Turner's syndrome, Patau's syndrome, Down syndrome

**Class: B.Sc. II (PR)****PRACTICAL-III (Major)****Practical based on Principles of Biochemistry (DSC03ZOO41) and Histology (DSC03ZOO42)**

Month	Practical Completed
January 2025	1. Estimation of glucose by using DNSA methods 2. Separation of amino acids by paper chromatography 3. Identification of Lipids by TLC 4. Qualitative tests to identify proteins and lipids in a given sample 5. Qualitative tests to identify lipids in a given sample 6. Qualitative tests to identify carbohydrates in given solutions (Glucose, Fructose, Sucrose, Lactose, and Starch) 7. Estimation of total protein in given solutions by Lowry's method/Biuret method.
February - 2024	8. Effect of pH on Salivary Amylase 9. Effect of Temperatures on Salivary Amylase 10. Detection of abnormal urine constituents from a given sample 11. Estimation of glycogen from liver tissue 12. Study of the different types of tissues with the help of permanent slides/photographs -epithelial tissue, connective tissue, muscular tissue, and nervous tissue.


March 2024-2024	13. Preparation of temporary mounts of striated & smooth muscle fibre. 14. Study of human blood smear to observe different types of blood cells. 15. Study of histological slides of (TS/LS) – bone and cartilage 16. Study of histological slides of (TS/LS) -Oesophagus, Stomach, Duodenum, Rectum, liver, salivary gland. 17. Study of histological slides of (TS/LS) -Brain, spinal cord, kidney, lungs, trachea 18. Study of histological slides of endocrine glands (TS/LS): Pituitary, pancreas, adrenal, thyroid
April - 2024	19. To study types of fixative used in histology 20. To study types of stains 21. Demonstration of histological staining techniques-HE techniques

**Class: B.Sc. III (PR)**

**PRACTICAL-VI (BASED ON PAPER NO XI AND XII)**

Month	Practical Completed
December - 2024	5. Study of histological structures of placenta (permanent slide or microphotographs) a. Epitheliochorial b. Endotheliochorial c. Hemochorial d. Syndesmochorial e. Hemoendothelial 6. Examination of gametes- Frog or rat sperm & ovum (permanent slides/microphotographs)
January 2025	7. Demonstration of culture of early chick embryo in vitro 8. <i>Drosophila</i> culture: Cultivation, maintenance
February 2025	9. Study of larval developmental stages in <i>Drosophilla</i> 10. Identification of fish developmental stages- Egg, larva, juvenile (fry, fingerlings and adult)
March 2025	11. Preparation of histological slides –Ovaries/ testes 12. Histology of male accessory reproductive glands in human - Prostate gland, bulbourethral glands (permanent slides/microphotographs)

  
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**Annual teaching plan**

**Name of the Teacher: Dr. S. S. Desai**

**Term: II**

**Class: B.Sc. II (Theory) Name of the Paper: Paper VII, Principles of Biochemistry (DSC03ZOO41)**

Month	Module unit	Sub unit
December 2024	UNIT-I	Carbohydrate Metabolism- Structure, classification and function of Carbohydrate, Glycolysis, Krebs cycle
January 2025	UNIT-I	Electron transport chain, Pentose phosphate pathway, Gluconeogenesis, Glycogenolysis
February 2025	UNIT-I	Lipid Metabolism- Structure, classification, properties, types and functions of lipids
March 2025	UNIT- I	Biosynthesis of fatty acids and cholesterols, $\beta$ oxidation of palmitic acid

**Class: B. Sc. III (Theory)**

**Name of the Paper: Paper- XI, Ecology and Toxicology (DSE-1008F3)**

Month	Module unit	Sub unit
December 2024	UNIT-I	Introduction and scope of ecology The structure, function, types ecosystem, abiotic and biotic components
January 2025	UNIT-I	Concept of habitat & niche- niche width and overlap, fundamental & realised niche, Food chain, food web and ecological pyramids, Species interactions-types of interaction (competition, predation, commensalism, parasitism, mutualism, amensalism)
February 2025	UNIT-I	Community ecology: Nature of communities, characteristics (species richness, dominance, diversity, abundance), ecotone and edge effect, Ecological succession -Types of succession (primary, secondary), stages of succession, mechanisms of succession, types of seres (hydrosere, lithosere)
March 2025	UNIT- I	Ecological adaptation in aquatic, desert & terrestrial animals



**Class: B.Sc. I (PR)****Practical: Zoology Lab (1): 2DSC03ZOO19 (Practical I)**

Month	Practical
December 2024	<ol style="list-style-type: none"> <li>Study of the following specimens with reference to morphological peculiarities and Classification up to orders: Protochordata: Amphioxus Cyclostomata: Petromyzon, Myxine</li> <li>Study of the Pisces with reference to morphological peculiarities and Classification up to orders: Torpedo, Exocoetus, Labeo</li> <li>Study of the Ambhibia with reference to morphological peculiarities and Classification up to orders: Ichthyophis, Bufo</li> <li>Study of the Reptiles with reference to morphological peculiarities and Classification up to orders: Draco, Chamaeleon</li> </ol>
January 2025	<ol style="list-style-type: none"> <li>Study of the Aves with reference to morphological peculiarities and Classification up to orders: Passer, Columba</li> <li>Study of the Mammals with reference to morphological peculiarities and Classification up to orders: Funambulus, Loris</li> <li>Characters identifying venomous and non-venomous snakes</li> <li>Study of any six common birds from different orders with the help of photographs and keys.</li> <li>Mounting of placoid/cycloid scale</li> </ol>
February 2025	<ol style="list-style-type: none"> <li>Demonstration of Barr bodies</li> <li>Study of Mendelian Inheritance using suitable examples.</li> <li>Study of gene interactions (Non-Mendelian Inheritance)</li> <li>Study of Human Karyotypes (normal and abnormal)</li> <li>Study of polytene chromosome</li> </ol>
March 2025	<ol style="list-style-type: none"> <li>Study of Sex determination in Drosophila</li> <li>Examples based on pedigree analysis</li> <li>Study of genetic disorders (with images/photographs) Turner's syndrome, Patau's syndrome, Down syndrome</li> </ol>

**Class: B.Sc. II (PR)****Practical: VSC03ZOO49**

Month	Practical
December 2024	<ol style="list-style-type: none"> <li>To study the anatomy of the fin fishes.</li> <li>To study the digestive and reproductive system of fin fishes</li> <li>Mounting of placoid and cycloid scales</li> <li>To study the induced breeding in fishes</li> </ol>
January 2025	<ol style="list-style-type: none"> <li>Identification of commercially important fin fishes</li> <li>Identification of commercially important shell fishes</li> <li>Estimation of carbonate and bicarbonate in water samples</li> <li>Estimation of chloride from water samples.</li> <li>Estimation of ammonia from water samples</li> </ol>
February 2025	<ol style="list-style-type: none"> <li>Methods of quality assessment to examine the freshness of fish.</li> <li>Maintenance of collected fishes/ Preservation techniques</li> <li>Method of Transportation of Fish Seeds</li> </ol>
March 2025	<ol style="list-style-type: none"> <li>Study of Fish by-products</li> <li>Modern Crafts and Gears.</li> <li>Estimation of muscle protein in fish by Biuret method.</li> </ol>

**Class: B.Sc. III (PR)**

**Practical: Practical-V (Based on Paper No. IX & X)**

Month	Practical
December 2024	1. To study Instruments- a) pH meter d) Cooling Centrifuge b) Spectrophotometer e) Laminar air flow c) Calorimeter f) CO <sub>2</sub> incubator
January 2025	2. Visit to tissue culture laboratory and bio-fertilizer industry 3. TLC-Thin layer chromatography 4. Study of DNA by Feulgen technique
February 2025	5. Microtechnique (HE, AB/ PAS)



**Dr. S. S. Desai**



**Dr. G. K. Sontakke**

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**Department of Zoology**  
**Academic year: 2024-2025**

**Annual teaching plan**

**Name of the Teacher: Mr. Ganesh H. Fadake**

**Term: II**

**Class: B.Sc. I Sem-II(Theory)**

Name of the Paper: DSC-IV: 2DSC03ZOO22: GENETICS

Month	Module unit	Sub unit
Dec- 2024	UNIT-I	Introduction to Genetics: Definition, scope and importance of genetics, Classical and modern concept of gene (Cistron, Muton, Recon),
Jan- 2025	UNIT-I	Brief explanation of following terms: Alleles, Wild type, Mutant allele, Locus, Dominant and recessive trait, Homozygous and heterozygous, Genotype and phenotype, Genome
Feb-2025	UNIT- I	Mendelian Genetics: Mendel's law of inheritance (Law of Dominance, Segregation and Independent assortment) Monohybrid cross, Dihybrid Cross, Test cross, Back cross.
Mar- 2025	UNIT- I	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.

**Class: B.Sc. II Sem-III (Minor)**

Name of the Paper: VIII-Tools and Techniques in Biology (MIN03Z0041)

Month	Module unit	Sub unit
Dec- 2024	UNIT- II	Separation techniques entrifugation- Basic principle, working and applications.
Jan- 2025	UNIT- II	Density gradient centrifugation and Differential centrifugation
Feb-2025	UNIT- II	Chromatography - Basic principle of chromatography; Types of chromatography techniques and their applications- Paper and Thin Layer Chromatography (TLC)
Mar- 2025	UNIT- II	Electrophoresis - Basic principle of electrophoresis, types (Agarose and SDS-PAGE), and their applications

**Class: B. Sc. III Semester: VI (Theory)**

ZOOLOGY-DSE -1008F2 Zoology-Paper XIV IMMUNOLOGY- II

Month	Module unit	Sub unit
Dec- 2024	UNIT-I	Working of the Immune system . Structure and functions of MHC
Jan- 2025	UNIT-I	Exogenous and endogenous pathways of antigen presentation and processing

Feb-2025	UNIT-I	Basic properties of signalling molecules-cytokines and their types
Mar- 2025	UNIT- I	(chemokines, interleukins, interferons, lymphokines, tumour necrosis factor)

**Class: B.Sc. I Sem-II (PR)**

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

Month	Practical
Dec- 2024	<ol style="list-style-type: none"> <li>1) Study of the following specimens with reference to morphological peculiarities and Classification up to orders: Protochordata: Amphioxus Cyclostomata: Petromyzon, Myxine</li> <li>2) Study of the Pisces with reference to morphological peculiarities and Classification up to orders: Torpedo, Exocoetus, Labeo</li> <li>3) Study of the Ambhibia with reference to morphological peculiarities and Classification up to orders: Ichthyophis, Bufo</li> <li>4) Study of the Reptiles with reference to morphological peculiarities and Classification up to orders: Draco, Chamaeleon</li> </ol>
Jan- 2025	<ol style="list-style-type: none"> <li>1) Study of the Aves with reference to morphological peculiarities and Classification up to orders: Passer, Columba</li> <li>2) Study of the Mammals with reference to morphological peculiarities and Classification up to orders: Funambulus, Loris</li> <li>3) Characters identifying venomous and non-venomous snakes</li> <li>4) Study of any six common birds from different orders with the help of photographs and keys.</li> </ol>
Feb-2025	<ol style="list-style-type: none"> <li>1) Mounting of placoid/cycloid scale</li> <li>2) Demonstration of Barr bodies</li> <li>3) Study of Mendelian Inheritance using suitable examples.</li> <li>4) Study of gene interactions (Non-Mendelian Inheritance)</li> </ol>
Mar- 2025	<ol style="list-style-type: none"> <li>1) Study of Human Karyotypes (normal and abnormal)</li> <li>2) Study of polytene chromosome</li> <li>3) Study of Sex determination in Drosophila</li> <li>4) Examples based on pedigree analysis</li> <li>5) Study of genetic disorders (with images/photographs) Turner's syndrome, Patau's syndrome, Down syndrome</li> </ol>

**Class: B.Sc. II Sem-III (PR)**

Name of the Paper: Tools and Techniques in Biology (MIN03Z0041) and Insect Pest Management (MIN03Z0042)

Month	Practical
Dec- 2024	<ol style="list-style-type: none"> <li>1) Introduction to microscope</li> <li>2) Cleaning and maintenance of microscope.</li> <li>3) Demonstration of different types of Microscope (Simple, Compound, Stereozoom, fluorescence )</li> </ol>
Jan- 2025	<ol style="list-style-type: none"> <li>1) Demonstration of microtomy processes</li> <li>2) Separation of molecules by density gradient centrifugation</li> <li>3) Separation of amino acids using paper chromatography</li> <li>4) Separation of amino acids using thin layer chromatography</li> </ol>
Feb-2025	<ol style="list-style-type: none"> <li>1) To study the Principles and application of the following Instruments. a) Incubator b) Spectrophotometer c) Colorimeter d) Cooling Centrifuge e) Rotary microtome f) Oven</li> </ol>



	2) Demonstration of DNA separation by agarose gel electrophoresis. 3) Study of morphology of insect (Cockroach/Grasshopper) 4) Study of different types of mouth parts in insect 5) Technique of collection and preservation of insect pests a. Wet preservation b. Dry preservation
Mar- 2024	6) Study of following insect pests with reference to classification, life cycle, marks of identification, nature of damage and management. a. Jowar – Stem borer b. Sugarcane – White grub c. Gram – Pod borer d. Mango – Jassids 7) Study of following stored grain pests with reference to scientific name, life cycle, marks of identification, nature of damage and management. 28 a. Rice weevil b. Pulse beetle 8) Study of beneficial insects and mites belongs to predators and parasitoid (Any two) 9) Collection, preservation and submission of insect pests (Any two) 10) Identification of Insect using key 11) Field visit and observation of insects , submission of report with photographs (any five insect)

**Class: B.Sc. III Sem-VI (PR)**

**PRACTICAL-VII - PRACTICAL-V (PAPER NO IX AND X)**

<b>Month</b>	<b>Practical</b>
Dec- 2024	1) To study following Instruments. a) pH meter b) Spectrophotometer c) Calorimeter d) Cooling Centrifuge e) Laminar air flow f) CO2 incubator
Jan- 2025	1) Visit to tissue culture laboratory and bio-fertilizer industry 2) TLC-Thin layer chromatography 3) Study of DNA by Feulgen technique.
Feb-2025	1) Microtechnique (HE, AB/ PAS) 2) Genomic DNA isolation from E. coli 3) Plasmid DNA isolation from E. coli

*Gadake*

**Mr. Ganesh H. Fadake**

*G.K.*

**Dr. G. K. Sontakke**

**HEAD**

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**Annual teaching plan**

**Name of the Teacher: Ms. N. A. Patel**

**Term: II**

**Class: B.Sc. I (Theory) Name of the Paper: Paper Genetics (2DSC03ZOO22)**

Month	Module unit	Sub unit
December 2024	UNIT-II	Mutations: Mutagenic agents (Physical and Chemical), Chromosomal Mutations: Deletion, Duplication, Inversion, Translocation, Aneuploidy and Polyploidy, Induced gene mutation
January 2025	UNIT-II	Basics of Human genetics: Autosomes and Sex chromosomes (Structure), Normal human Karyotype Sex Determination: Sex determination in man, Haploidy-diploidy mechanism in Honey bee,
February 2025	UNIT-II	Environmental sex determination (Bonelia) Genetic Disorders: Causes and symptoms of genetic disorders, Sickle cell Anaemia, Phenylketonuria,
March 2025	UNIT- II	Genetic Disorders: Albinism, Down syndrome, Turner's Syndrome, Edward Syndrome, Klinefelter syndrome

**Class: B.Sc. II (Theory) Name of the Paper: Paper VIII, Insect Pest Management (MIN03ZOO42)**

Month	Module unit	Sub unit
December 2024	UNIT-I	Introduction to Insects and Pest: General characters and morphology of the Insect. Economic importance of insects- A. Beneficial insects (Pollinators of crops, Predators pests, Parasites of pests, Productive insects (Silkworm, Honey bee, Lac insect)
January 2025	UNIT-I	Injurious insects ( House hold pests, Stored grain pests, Medicinal Pests, Veterinary pests)
February 2025	UNIT-I	House hold pests: Cockroach, Clothes Moth, Furniture beetle, Silverfish.
March 2025	UNIT- I	Stored grain pests: Rice weevil, Rice moth, Pulse beetle, Rust red flour beetle.



**Class: B. Sc. III (Theory)**

**Name of the Paper: Paper- XIII, Immunology (DSE-1008F1)**

Month	Module unit	Sub unit
December 2024	UNIT-I	Antibodies: Structure, classes and function of antibodies Antigen-Antibody interactions: Cross-reactivity, compliment fixation
January 2025	UNIT-I	Antigen-Antibody interactions: precipitation reactions, agglutination reactions
February 2025	UNIT-I	ELISA & its type, immunofluorescence, Hybridoma technology
March 2025	UNIT- I	Monoclonal antibodies in therapeutics and diagnosis.

**Class: B.Sc. I (PR)**

**Practical: Zoology Lab (1): 2DSC03ZOO19 (Practical I)**


Month	Practical
December 2024	<ol style="list-style-type: none"><li>1. Study of the following specimens with reference to morphological peculiarities and Classification up to orders: Protochordata: Amphioxus Cyclostomata: Petromyzon, Myxine</li><li>2. Study of the Pisces with reference to morphological peculiarities and Classification up to orders: Torpedo, Exocoetus, Labeo</li><li>3. Study of the Ambhibia with reference to morphological peculiarities and Classification up to orders: Ichthyophis, Bufo</li><li>4. Study of the Reptiles with reference to morphological peculiarities and Classification up to orders: Draco, Chamaeleon</li></ol>
January 2025	<ol style="list-style-type: none"><li>5. Study of the Aves with reference to morphological peculiarities and Classification up to orders: Passer, Columba</li><li>6. Study of the Mammals with reference to morphological peculiarities and Classification up to orders: Funambulus, Loris</li><li>7. Characters identifying venomous and non-venomous snakes</li><li>8. Study of any six common birds from different orders with the help of photographs and keys.</li><li>9. Mounting of placoid/cycloid scale</li></ol>
February 2025	<ol style="list-style-type: none"><li>10. Demonstration of Barr bodies</li><li>11. Study of Mendelian Inheritance using suitable examples.</li><li>12. Study of gene interactions (Non-Mendelian Inheritance)</li><li>13. Study of Human Karyotypes (normal and abnormal)</li><li>14. Study of polytene chromosome</li></ol>
March 2025	<ol style="list-style-type: none"><li>15. Study of Sex determination in Drosophila</li><li>16. Examples based on pedigree analysis</li><li>17. Study of genetic disorders (with images/photographs) Turner's syndrome, Patau's syndrome, Down syndrome</li></ol>

**Class: B.Sc. III (PR)**

**Practical: Practical-VII (Based on Paper No. XIII & XIV)**

Month	Practical
December 2024	Agglutination reactions- Latex agglutination reactions. WIDAL test, Project work
January 2025	Direct antiglobulin test (Coomb's test) Performing blood cells isolation from whole blood sample Identification of autoimmune disease through charts.
February 2025	Demonstration of a) ELISA and b) Immunoelectrophoresis

  
**Ms. N. A. Patel**

  
**Dr. G. K. Sontakke**  
**HEAD**  
**DEPARTMENT OF ZOOLOGY**  
**VIVEKANAND COLLEGE, KOLHAPUR**  
**(EMPOWERED AUTONOMOUS)**



“Dissemination of Education for Knowledge, Science and Culture”

-Shikshanmaharshi Dr. Bapuji Salunkhe

Shri Swami Vivekanand Shikshan Sanstha's

**Vivekanand College, Kolhapur (Empowered Autonomous)**

**Department of Zoology**

**Academic year: 2024-25**

**Annual teaching plan**

**Name of the Teacher: Dr. Tejashri C. Patil**

**Term: II**

**Class: B.Sc. III**

**Name of the Paper: Immunology II ((DSE1008F2)**

Month	Module unit	Sub unit
December-2024	UNIT-II	Complement system Gell and Coombs classification of hypersensitivity
January- 2025	UNIT-II	Autoimmune disease- Organ-specific autoimmune diseases (insulin-dependent diabetes mellitus, Hashimoto's thyroiditis) And systemic autoimmune diseases- (multiple sclerosis, rheumatoid arthritis)
February-2025	UNIT-II	Concept of immunodeficiency Vaccines- Properties of vaccines, active and passive immunization
March-2025	UNIT-II	Types of vaccine- attenuated, inactivated, DNA vaccines, toxoids.

**Class: B.Sc. II**

**Name of the Paper: Histology DSC03ZOO42**

Month	Module unit	Sub unit
January- 2025	UNIT-II	1. Introduction: Definition and Scope of Histology. 2. Definitions and Types of Tissues: Epithelial tissue, connective tissue, Nervous tissue, Muscular tissue.
February-2025	UNIT-II	3. Histological study of the alimentary canal: Oesophagus, Stomach, duodenum, rectum, liver, salivary gland
March-2025	UNIT-II	4. Histological study of the respiratory system- lungs and trachea
April-2025	UNIT-II	5. Histological study of excretory organs: kidney, juxtaglomerular complex

**Class: B.Sc. I Batch B3 Practical: Based on: Animal Diversity II Zoology and Genetics**

Month	Practical
January- 2025	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
February-2025	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. Study of any six common birds from different orders with the help of photographs and keys. 9. Mounting of placoid/cycloid scale
March-2025	GENETICS LAB (At least 7 experiments) 1. Demonstration of Barr bodies 2. Study of Mendelian Inheritance using suitable examples. 3. Study of gene interactions (Non-Mendelian Inheritance) 4. Study of Human Karyotypes (normal and abnormal)
April-2025	5. Study of polytene chromosome 6. Study of Sex determination in Drosophila 7. Examples based on pedigree analysis 8. Study of genetic disorders (with images/photographs) Turner's syndrome, Patau's syndrome, Down syndrome 9. Field visit-Museum, National park, Sea shore

**Class: B.Sc. II Batch Z1 Practical: Based on: Biochemistry (DSC03ZOO41) and Histology (DSC03ZOO42)**

Month	Practical
January-2025	1. Estimation of glucose by using DNSA methods 2. Separation of amino acids by paper chromatography 3. Identification of Lipids by TLC 4. Qualitative tests to identify proteins and lipids in a given sample 5. Qualitative tests to identify lipids in a given sample 6. Qualitative tests to identify carbohydrates in given solutions (Glucose, Fructose, Sucrose, Lactose, and Starch) 7. Estimation of total protein in given solutions by Lowry's method/Biuret method.
February-2025	8. Effect of pH on Salivary Amylase 9. Effect of Temperatures on Salivary Amylase 10. Detection of abnormal urine constituents from a given sample 11. Estimation of glycogen from liver tissue 12. Study of the different types of tissues with the help of permanent slides/photographs -epithelial tissue, connective tissue, muscular tissue, and nervous tissue. 13. Preparation of temporary mounts of striated & smooth muscle fibre. 14. Study of human blood smear to observe different types of blood cells.



March-2025	15. Study of histological slides of (TS/LS) – bone and cartilage 16. Study of histological slides of (TS/LS) -Oesophagus, Stomach, Duodenum, Rectum, liver, salivary gland. 17. Study of histological slides of (TS/LS) -Brain, spinal cord, kidney, lungs, trachea 18. Study of histological slides of endocrine glands (TS/LS): Pituitary, pancreas, adrenal, thyroid 19. To study types of fixative used in histology 20. To study types of stains 21. Demonstration of histological staining techniques-HE techniques
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**Class: B.Sc. III Batch TA Practical: Based on: Practical-VII (On Paper No XIII And XIV)**

Month	Practical
December-2024	8. Agglutination reactions- Latex agglutination reactions. 9. WIDAL test
January- 2025	10. Direct antiglobulin test (Coomb's test) 11. Performing blood cells isolation from whole blood sample
February-2025	12. Identification of autoimmune disease through charts. 13. Demonstration of a) ELISA (photograph)



**Dr. Tejashri C. Patil**



**Dr. G. K. Sontakke**

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**Department of Zoology**  
**Academic year: 2024-2025**

**Annual Teaching Plan**

**Name of the Teacher: Miss. Namrata Ajit Jadhav**

**Term: II- Theory**

**Class: B.Sc. I Sem.-II**

**Name of the Paper: DSC-III: Animal Diversity-II (2DSC03ZOO21)**

Month	Module Unit	Sub-Unit
Dec- 2024	UNIT-1	Protochordata: General characters and Classification of Protochordata Agnatha: General characters of Agnatha and Classification of cyclostomes up to classes
Jan- 2025	UNIT-1	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
Feb-2025	UNIT- 2	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
Mar- 2025	UNIT- 2	Mammals: General characters and classification up to subclasses; Important characters of following Eutherian orders with examples, Primates, Chiroptera and Rodentia

**Class: B.Sc. II Sem.- IV (Major)**

**Name of the Paper: Paper- VIII, Histology (DEC03ZOO42)**

Month	Module Unit	Sub-Unit
Dec- 2024	UNIT-II	Histological study of the reproductive organ: testes and Ovary
Jan- 2025	UNIT-II	Histology of endocrine glands – Hypothalamus, pineal, pituitary, thyroid, parathyroid, Thymus, pancreas, adrenal
Feb-2025	UNIT- II	Histology of Circulatory system – Heart, Arteries, Vein and capillary



Mar- 2025	UNIT- II	Histology of Bone, Cartilage, Ligament
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**Class: B.Sc. I Sem.-II (PR) (Batch- B6)**

**Practical: DSC- PR-II : 2DSC03ZOO29**

**Practicals based on Animal Diversity- II (2DSC03ZOO21) and Genetics (2DSC03ZOO22)**

Month	Practical
Dec- 2024	<ol style="list-style-type: none"> <li>1. Study of the following specimens with reference to morphological peculiarities and Classification up to orders: Protochordata: <i>Amphioxus</i> Cyclostomata: <i>Petromyzon</i>, <i>Myxine</i></li> <li>2. Study of the Pisces with reference to morphological peculiarities and Classification up to orders: <i>Torpedo</i>, <i>Exocoetus</i>, <i>Labeo</i></li> <li>3. Study of the Ambhibia with reference to morphological peculiarities and Classification up to orders: <i>Ichthyophis</i>, <i>Bufo</i></li> <li>4. Study of the Reptiles with reference to morphological peculiarities and Classification up to orders: <i>Draco</i>, <i>Chamaeleon</i></li> </ol>
Jan- 2025	<ol style="list-style-type: none"> <li>5. Study of the Aves with reference to morphological peculiarities and Classification up to orders: <i>Passer</i>, <i>Columba</i></li> <li>6. Study of the Mammals with reference to morphological peculiarities and Classification up to orders: <i>Funambulus</i>, <i>Loris</i></li> <li>7. Characters identifying venomous and non-venomous snakes</li> <li>8. Study of any six common birds from different orders with the help of photographs and keys.</li> <li>9. Mounting of placoid/cycloid scale</li> </ol>
Feb-2025	<ol style="list-style-type: none"> <li>1. Demonstration of Barr bodies</li> <li>2. Study of Mendelian Inheritance using suitable examples.</li> <li>3. Study of gene interactions (Non-Mendelian Inheritance)</li> <li>4. Study of Human Karyotypes (normal and abnormal)</li> </ol>
Mar- 2025	<ol style="list-style-type: none"> <li>5. Study of polytene chromosome</li> <li>6. Study of Sex determination in <i>Drosophila</i></li> <li>7. Examples based on pedigree analysis</li> <li>8. Study of genetic disorders (with images/photographs) Turner's syndrome, Patau's syndrome, Down syndrome</li> </ol>

**Class: B.Sc. II Sem.- IV (PR) (Minor, Batch- ZM3)**

**Paper- VII & VIII ZOOLOGY LAB (4): DSC03ZOO49 (Practical IV)**

**Practical based on Principles of Biochemistry (DSC03ZOO41) and Histology (DSC03ZOO42)**


Month	Practical
Dec- 2024	<ol style="list-style-type: none"> <li>1. Introduction to microscope</li> <li>2. Cleaning and maintenance of microscope.</li> </ol>

	3. Demonstration of different types of Microscope (Simple, Compound, Stereozoom, fluorescence)
Jan- 2025	4. Demonstration of microtomy processes 5. Separation of molecules by density gradient centrifugation 6. Separation of amino acids using paper chromatography 7. Separation of amino acids using thin layer chromatography
Feb-2025	8. To study the Principles and application of the following Instruments. a) Incubator b) Spectrophotometer c) Colorimeter d) Cooling Centrifuge e) Rotary microtome f) Oven 9. Demonstration of DNA separation by agarose gel electrophoresis. 10. Study of morphology of insect (Cockroach/Grasshopper) 11. Study of different types of mouth parts in insect
Mar- 2024	12. Technique of collection and preservation of insect pests a. Wet preservation b. Dry preservation 13. Study of following insect pests with reference to classification, life cycle, marks of identification, nature of damage and management. a. Jowar – Stem borer b. Sugarcane – White grub c. Gram – Pod borer d. Mango – Jassids 14. Study of following stored grain pests with reference to scientific name, life cycle, marks of identification, nature of damage and management. a. Rice weevil b. Pulse beetle 15. Study of beneficial insects and mites belongs to predators and parasitoid (Any two)

**Class: B.Sc. III, (Batch- TB2), PRACTICAL-VI (BASED ON PAPER NO XI AND XII)**

Month	Practical
Dec- 2024	7. Demonstration of culture of early chick embryo in vitro 8. <i>Drosophila</i> culture: Cultivation, maintenance
Jan- 2025	9. Study of larval developmental stages in <i>Drosophila</i> 10. Identification of fish developmental stages- Egg, larva, juvenile (fry, fingerlings and adult)
Feb-2025	11. Preparation of histological slides – Ovaries/ testes 12. Histology of male accessory reproductive glands in human - Prostate gland, bulbourethral glands (permanent slides/microphotographs)

  
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**Department of Zoology**

**Academic year: 2024-2025**

**Annual teaching plan**

**Name of the Teacher: Ms. Pratiksha R. Gaikwad**

**Term: II**

**Class: B.Sc. II, Sem-III (Minor)**

**Name of the Paper: VIII-Tools and Techniques in Biology (MIN03Z0041)**

Month	Module unit	Sub unit
Dec- 2024	UNIT- I	Basics of Microscopy- Definition, Magnification and Resolving Power
Jan- 2025	UNIT- I	Principle and Application of Microscopy- Light (bright-field,
Feb-2025	UNIT- I	dark-field and phase contrast), Fluorescence Microscope
Mar- 2025	UNIT- I	Electron Microscope (SEM and TEM)

**Class: B. Sc. III, Semester: VI (Theory)**

**Name of the Paper: XV-Ecology and Toxicology (ZOOLOGY-DSE -1008F3)**

Month	Module unit	Sub unit
Dec- 2024	UNIT-II	Definition, history, scope & divisions of toxicology.
Jan- 2025	UNIT-II	Brief idea of- Dose-effect and dose-response relationship- acute toxicity, sub-acute toxicity, chronic toxicity, organ specific toxicity (neurotoxicity, hepatotoxicity, nephrotoxicity)
Feb-2025	UNIT-II	Heavy metal Toxicity- Mercury, lead, cadmium.
Mar- 2025	UNIT- II	Classification of toxic agents- Natural toxins, animal toxins, plant toxins, food toxins, and chemical toxins.

**Class: B.Sc. I (PR) (Batch: B9)**

**Practical: 2DSC03ZOO29 (Practical II)**

**Practicals based on Animal diversity II (DSC03ZOO21) and Genetics (DSC03ZOO22)**

Month	Practical
Dec- 2024	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
Jan- 2025	1) Study of the Aves with reference to morphological peculiarities and Classification up to orders: Passer, Columba 2) Study of the Mammals with reference to morphological peculiarities and Classification up to orders: Funambulus, Loris 3) Characters identifying venomous and non-venomous snakes 4) Study of any six common birds from different orders with the help of photographs and keys.
Feb-2025	1) Mounting of placoid/cycloid scale 2) Demonstration of Barr bodies 3) Study of Mendelian Inheritance using suitable examples. 4) Study of gene interactions (Non-Mendelian Inheritance)
Mar- 2025	1) Study of Human Karyotypes (normal and abnormal) 2) Study of polytene chromosome 3) Study of Sex determination in Drosophila 4) Examples based on pedigree analysis 5) Study of genetic disorders (with images/photographs) Turner's syndrome, Patau's syndrome, Down syndrome

**Class: B.Sc. II (Minor Batch: ZM1, ZM5)**


**Practical: MIN03ZOO49 (Practical IV)**


**Practicals based on Tools and Techniques in Biology (MIN03Z0041) and Insect Pest Management (MIN03ZOO42)**

Month	Practical
Dec- 2024	1) Introduction to microscope 2) Cleaning and maintenance of microscope. 3) Demonstration of different types of Microscopes (Simple, Compound, Stereozoom, fluorescence)
Jan- 2025	1) Demonstration of microtomy processes 2) Separation of molecules by density gradient centrifugation 3) Separation of amino acids using paper chromatography 4) Separation of amino acids using thin layer chromatography
Feb-2025	1) To study the principles and application of the following Instruments. a) Incubator b) Spectrophotometer c) Colorimeter d) Cooling Centrifuge e) Rotary microtome f) Oven 2) Demonstration of DNA separation by agarose gel electrophoresis. 3) Study of morphology of insect (Cockroach/Grasshopper) 4) Study of different types of mouth parts in insect 5) Technique of collection and preservation of insect pests a. Wet preservation b. Dry preservation



Mar- 2024	<p>6) Study of following insect pests with reference to classification, life cycle, marks of identification, nature of damage and management. a. Jowar – Stem borer b. Sugarcane – White grub c. Gram – Pod borer d. Mango – Jassids</p> <p>7) Study of following stored grain pests with reference to scientific name, life cycle, marks of identification, nature of damage and management. 28 a. Rice weevil b. Pulse beetle</p> <p>8) Study of beneficial insects and mites belongs to predators and parasitoid (Any two)</p> <p>9) Collection, preservation and submission of insect pests (Any two)</p> <p>10) Identification of Insect using key</p> <p>11) Field visit and observation of insects, submission of report with photographs (any five insect)</p>
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**Ms. P. R. Gaikwad**

  
**Dr. G. K. Sontakke**  
**HEAD**  
 DEPARTMENT OF ZOOLOGY  
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 (EMPOWERED AUTONOMOUS)

**Annual Teaching Plan**

**Name of the Teacher: Ms. P. S. Shetfalkar**

**Term: II**

**Class: B.Sc. II Minor (Theory)**

**Name of the Paper: Paper VIII, Insect Pest Management (MIN03ZOO42)**

Month	Module unit	Sub unit
December 2024	UNIT-II	Identification, Characteristics, Life cycle, Damage and Control of following insect pests. Medicinal Pests: Mosquitoes, Bedbug, Sandfly, Tse-Tse fly
January 2025	UNIT-II	Veterinary pests: Sandfly, Horsefly, Stable fly, Rat flea
February 2025	UNIT-II	Integrated Pest Management (IPM): Need, its tools and limitations. Natural Control, Applied control,
March 2025	UNIT- II	Biopesticides- Definition, types and Advantages

**Class: B. Sc. III (Theory)**

**Name of the Paper: Paper- XVI, Aquatic Biology (DSE-1008F)**

Month	Module unit	Sub unit
December 2024	UNIT-I	Freshwater biology Introduction of the aquatic biomes: Freshwater ecosystem (wetlands, streams and rivers)
January 2025	UNIT-I	Origin and classification Ponds & lakes, physico-chemical characteristics: light, temperature stratification, dissolved solids, turbidity; dissolved gases (oxygen, carbon dioxide), nutrient cycling (nitrogen, phosphorus, sulphur, carbon)
February 2025	UNIT-I	Streams: Types of streams, physicochemical environment, conservation of streams, adaptation of hill stream fishes
March 2025	UNIT- I	Estuaries: Characteristics & types (based on salinity) Eutrophication

**Class: B.Sc. I (PR)**

**Practical: Zoology Lab (1): 2DSC03ZOO19 (Practical I)**

Month	Practical
December 2024	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
January 2025	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. Study of any six common birds from different orders with the help of photographs and keys. 9. Mounting of placoid/cycloid scale
February 2025	10. Demonstration of Barr bodies 11. Study of Mendelian Inheritance using suitable examples. 12. Study of gene interactions (Non-Mendelian Inheritance) 13. Study of Human Karyotypes (normal and abnormal) 14. Study of polytene chromosome
March 2025	15. Study of Sex determination in Drosophila 16. Examples based on pedigree analysis 17. Study of genetic disorders (with images/photographs) Turner's syndrome, Patau's syndrome, Down syndrome

**Class: B.Sc. II (PR)**

**Practical: MIN03ZOO49**

Month	Practical
December 2024	1. Introduction to microscope 2. Cleaning and maintenance of microscope. 3. Demonstration of different types of Microscope (Simple, Compound, Stereozoom, fluorescence ) 4. Demonstration of microtomy processes
January 2025	5. Separation of molecules by density gradient centrifugation 6. Separation of amino acids using paper chromatography 7. Separation of amino acids using thin layer chromatography 8. To study the principles and application of the following Instruments 9. Demonstration of DNA separation by agarose gel electrophoresis.
February 2025	10. Study of morphology of insect (Cockroach/Grasshopper) 11. Study of different types of mouth parts in insect 12. Study of different types of mouth parts in insect
March 2025	13. Study of following insect pests with reference to classification, life cycle, marks of identification, nature of damage and management. a. Jowar – Stem borer b. Sugarcane – White grub c. Gram – Pod borer d. Mango – Jassids 14. Study of following stored grain pests with reference to scientific name, life cycle, marks of identification, nature of damage and management. a. Rice weevil b. Pulse beetle 15. Study of beneficial insects and mites belongs to predators and parasitoid (Any two) 16. Identification of Insect using key

**Class: B.Sc. III (PR)**

**Practical: Practical-VIII (Based on Paper No. XV & XVI)**

Month	Practical
December 2024	1. Determination alkalinity of given water sample 2. Determination total hardness of given water sample
January 2025	3. Determination of chloride from given water sample 4. Study of ecological pyramids
February 2025	5. Study of coral reefs (model) 6. Report on a visit to a Sewage treatment plant/Marine bio reserve/ Fisheries Institutes



**Ms. P. S. Shetfalkar**



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