



Dnyanopasak Shikshan Mandal's
College of Arts, Commerce and Science, Parbhani

Pro-forma for program and course outcomes (2.6.1)

Name of Teacher: Tanveer Kausar S K. A.H.

Department: Zoology

Program: B.Sc. FY

Subject: Zoology

Course Code: CCZ-I

Paper Title: PAPER I: Biodiversity of Invertebrates

Unit Number	Topics	Unit-wise Outcome
I	1. Introduction of Non-chordates 2. Protozoa: General characters and classification up to class level with suitable examples; Locomotory Organelles and locomotion in Protozoa. Structure, Life Cycle, Pathogenicity and Control Measures of Plasmodium vivax. 3. Porifera:-General characters and classification up to class level with suitable examples; Canal System in Sycon; Economic importance of Porifera.	Identify and classify the Biodiversity of Invertebrates animal's phylum Protozoa and Porifera, economic importance of Porifera.
II	1. Coelenterata: General characters and classification up to class level with suitable examples; Polymorphism in Hydrozoa. 2. Platyhelminthes: General characters and classification up to class level with suitable examples; Structure, Life Cycle, Pathogenicity and Control Measures of Taenia solium. 3. Nematelminthes: General characters and classification up to class level with suitable	Identify and classify Coelenterata, Platyhelminthe and Platyhelminthes morphological structure and life cycle.

	examples; Structure, Life Cycle, Pathogenicity and Control Measures of <i>Ascaris lumbricoides</i> .	
III	1. Annelida: General characters and classification up to class level with suitable examples; Metamerism in Annelida; vermiculture and vermicomposting. 2. Arthropoda: General characters and classification up to class level with suitable examples; Vision in Arthropoda, Metamorphosis in Insects. Cockroach- External Morphology, Digestive system, Respiratory system, Nervous system. Economic importance of insects.	Explain, Identify and classify Annelida and Arthropoda. Extend with study of External Morphology of Cockroach and Economic importance of insects.
IV	1. Mollusca: General characters and classification up to class level with suitable examples; Economic importance of mollusca. 2. Echinodermata: General characters and classification up to class level with suitable examples; Star Fish- External Morphology, Larval forms in Echinoderms. 3. Hemichordata: General Characters and Affinities.	Outline the general about Mollusca and Echinodermata. Compare the relationship Affinities of Hemichordate with other phyllums.

Specify Course Outcome: Identify and classify Invertebrate organism base on morphological and anatomical.

Specify Program Outcome: Identify, Explain and classify animals morphologically, anatomically and embryologically with practice of cytological & microscopic technique

Signature of Teacher



Dnyanopasak Shikshan Mandal's
College of Arts, Commerce and Science, Parbhani

Pro-forma for program and course outcomes (2.6.1)

Name of Teacher: Mr. Shaikh Ubaid S. K. Masood.

Department: Zoology.

Program: BSc FY

Subject: Zoology.

Course Code: CCZ-I.

Paper Title: Biodiversity of Chordates: P-II.

Unit Number	Unit Name	Topics	Unit-wise Outcome
1	I	Introduction of Chordates Salient features and classification of chordates up to class level. Origin and Ancestry of Chordata Protochordata: Urochordata-General features and Phylogeny of Urochordata; Cephalochordata- General features and Phylogeny of Cephalochordata. Agnatha: General characters and classification of Agnatha with suitable examples. Cyclostomata: General characters with suitable examples.	Identify and differentiate the Biodiversity of primitive chordate animals.
2	II	Pisces: General characters and classification up to order level with suitable examples; Scoliodon (Dogfish): External morphology, Digestive system, Respiratory system, Circulatory System, Nervous system, Urinogenital system. Economic importance of Fishes. Amphibia: General characters and classification up to order level with suitable examples; Parental care in Amphibians; Hibernation and aestivation in Frog.	Identify and classify amphibians and fishes morphologically, economic importance of fishes.

3	III	<p>Reptiles: General characters and classification up to order level with suitable examples; Poisonous and non-poisonous snakes; Biting mechanism in snakes; Importance of snake Venom.</p> <p>Aves: General characters and classification up to order level with suitable examples; Flight Adaptations in birds; Migration in birds.</p>	Learn anatomical relationship between different vertebrate classes.
4	IV	<p>Mammals: General characters and classification up to order level with suitable examples.</p> <p>Rat- External characters, Digestive system, Respiratory system, Circulatory system, Nervous system - Brain and spinal cord, Eye and Ear.</p>	Identify and classify anatomical structures of mammalian organs.

Specify Course Outcome: Identify and classify animals based on morphological and anatomical.

Specify Program Outcome: Identify, Explain and classify animals morphologically, anatomically and embryologically with practice of cytological & microscopic technique.

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Pro-forma for program and course outcomes (2.6.1)

Name of Teacher: Tanveer Kausar SK. A.H.

Department: Zoology

Program: B.Sc. FY

Subject: Zoology

Course Code: CCZ-II

Paper Title:-III: Comparative Anatomy of Vertebrates

Unit Number	Topics	Unit-wise Outcome
I	1. General characters, origin and Ancestry of Vertebrates. 2. Integumentary System: Development, General structure and function of integument; Derivatives of integument- Epidermal and Dermal derivatives; 3. Skeletal System- Evolution of visceral arches; Comparative account of Limbs and girdles.	Interpret the comparative anatomical structure of integument and their derivatives of vertebrates. Compare the evolutionary evidences in skeletal system of vertebrates.
II	1. Digestive System: Brief account of alimentary canal and digestive glands. 2. Respiratory System: Brief account of different respiratory organs in vertebrates- Gills, lungs, skin, air sacs and Accessory respiratory organs.	Demonstrate the comparative anatomical structure of Alimentary canal, Lungs and Accessory respiratory organs in vertebrates.
III	1. Circulatory System: Brief account of Evolution of heart in vertebrates. Modifications of aortic arches in vertebrates; Blood circulation in various vertebrate groups- Single and Double circulation 2. Urinogenital System: Developmental	Describe the Circulatory System and Urinogenital System in vertebrates with reference to evolutionary changes.

	Succession of kidney, Evolution of urinogenital system in vertebrates.	
IV	1. Nervous System: Structure of Neuron; Comparative account of Brain of Vertebrates. 2. Sense Organs - Types of receptors- Mechanoreceptors; Photoreceptors; Phonoreceptors.	Explain the Comparative account of Brain of Vertebrates. Clarify the concept of sense organs.

Specify Course Outcome: Clarify the concept of Comparative Anatomy of Internal organs of Vertebrates.

Specify Program Outcome: Identify, Explain and classify animals morphologically, anatomically and embryologically with practice of cytological & microscopic technique

Signature of Teacher



Dnyanopasak Shikshan Mandal's
College of Arts, Commerce and Science, Parbhani

Pro-forma for program and course outcomes (2.6.1)

Name of Teacher: Mr. Shaikh Ubaid S. K. Masood

Department: Zoology

Program: B.Sc. F. Y.

Subject: Zoology

Course Code: CCZ-II

Paper Title: Developmental Biology of Vertebrates: P-IV.

Unit Number	Unit Name	Topics	Unit-wise Outcome
1	I	1. Introduction of Developmental Biology 2. Early Embryonic Development: Gametogenesis: Spermatogenesis and oogenesis in mammals; vitellogenesis in birds; 3. Types of eggs: a) On the basis of amount of yolk b) On the basis of distribution of yolk	Explain the basic processes of vertebrate embryonic development
2	II	1. Gametes of Frog: a) Structure of sperm; b) Structure of ovum; 2. Frog Embryology: a) Fertilization; b) Cleavage; c) Blastulation; d) Gastrulation; e) Formation of three germinal layers; 3. Regeneration in chordates.	Describe the various steps in vertebrate development.
3	III	1. Chick Embryology: (Extra-embryonic membranes) - Structure and functions of- Amnion; Chorion; Yolk sac; Allantois 2. Placentation in mammals: Classification on the basis of- Origin; Histology; Distribution of villi. Functions of Placenta.	Explain about the different embryonic and extra-embryonic structures.
4	IV	1. Stem Cell: a) Sources; b) Types – Embryonic, Haemopoitic, Adult, Nervous; c) Role of stem cells in human health. 2. Infertility in Humans-Causes, diagnosis and	Learn Assisted Reproductive Technologies

		<p>treatment.</p> <p>3. Assisted Reproduction Technologies- a) In-Vitro Fertilization (IVF) b) Gamete Intra-Fallopian Transfer (GIFT); c) Intra cytoplasmic Sperm injection (ICSI); d)Zygote Intrafallopian transfer (ZIFT); e) Intrauterine Insemination (IUI)</p> <p>4. Parthenogenesis: a) Natural; b) Artificial.</p>	
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- **Specify Course Outcome:** Specify Course Outcome: Learn and describe basic embryonic and extra-embryonic development, developmental processes and assisted reproductive technologies.
- **Specify Program Outcome:** Identify and classify animals based on morphological and anatomical features, development in chick & amphibians and practice cytological & microscopic technique.

Signature of Teacher



Dnyanopasak Shikshan Mandal's
College of Arts, Commerce and Science, Parbhani

Pro-forma for program and course outcomes (2.6.1)

Name of Teacher: Shewale P.A.

Department: Zoology

Program: B.Sc.F.Y

Subject: Zoology

Course Code: CCZP-I

Paper Title: Biodiversity of Invertebrates and Chordates & Comparative Anatomy and Developmental Biology of Vertebrates.

Unit Number	Topics	Unit-wise Outcome
	<p>1. Study of at least two museum specimens from Invertebrate Phyla. (Protozoa to Echinodermata and Hemichordata).</p> <p>2. Study of at least two museum specimens from Protochordata to Mammalia.</p> <p>3. Demonstration based on Models, Charts and Computer Aided Techniques: i) Cockroach: Digestive system, Nervous system. ii) Scoliodon: Digestive system, Heart and ventral Aorta, Afferent arteries, Brain.</p> <p>4. Key for Identification of poisonous and non-poisonous snakes.</p> <p>5. Permanent Mountings - i) Mouth parts of Cockroach; ii) Trachea of Cockroach; iii) Salivary glands of Cockroach; iv) Nereis Parapodia; v) Mounting of different types Scales (From Locally Available Fishes): Cycloid, Ctenoid</p>	<p>Ability to identify and describe structure and functions of different body parts of invertebrates and vertebrates.</p> <p>Students would be able to prepare temporary and permanent mountings of biological material.</p>

	preparations. iii) Animal Album <i>or</i> Articulated complete skeleton of any locally available animal iv) Excursion report	
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- **Specify Course Outcome:** Explain and demonstrate identification of animals, vertebrates, embryological stages and field reporting.
- **Specify Program Outcome:** Identify and classify animals based on morphological and anatomical features, development in chick & amphibians and practice cytological & microscopic technique.

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Pro-forma for program and course outcomes (2.6.1)

Name of Teacher: Tanveer Kausar SK. A.H.

Department: Zoology

Program: B.Sc. SY

Subject: Zoology

Course Code: CCZ III

Paper Title: GENETICS (VI)

Unit Number	Topics	Unit-wise Outcome
I	1) Introduction to Genetics 2) Mendelism i) Mendel's Laws of inheritance ii) Monohybrid, dihybrid cross and ratio. iii) Incomplete dominance. iv) Back cross and test cross. 3) Interaction of genes i) Complementary factor (9:7) ii) Supplementary factor (9:3:4) iii) Inhibitory factor (13:3) iv) Duplicate genes (15:1) v) Lethal genes (1:2:1)	Learn the basic of Mendel's Laws of inheritance by using the different examples cross and ratio.
II	1) Multiple Alleles and Genes i) Inheritance of ABO Blood groups in Man. ii) Rh factor and Erythroblastosis foetalis in man. iii) Multiple genes – skin pigmentation in man. 2) Linkage and Crossing over i) Linkage – definition, types and significance ii) Crossing over – a) Mechanism of crossing over, b) Factor affecting crossing over, c) Significance of crossing over.	Interpret the concept of Multiple Alleles Inheritance. Learn the Linkage and Crossing over.

<p style="text-align: center;">III</p>	<p>1) Sex determination i) Chromosomal methods of sex determination. ii) Bridge's ratio theory of genic balance. 2) Sex linked inheritance i) Sex linked inheritance in Drosophila. ii) Sex linked inheritance in man – colourblindness, haemophilia, Hypertrichosis 3) Cytoplasmic Inheritance-Ex. Kappa Particles (Paramecium) 4) Mutation i) Chromosomal mutations – Structural alterations & Numerical alteration (Polyploidy). ii) Gene mutations – Sickle Cell Anaemia. iii) Mutagenic agents.</p>	<p>Explain the Sex determination examples of Sex linked inheritance and Mutation.</p>
<p style="text-align: center;">IV</p>	<p>1) Human Genetics i) Syndromes – Turner, Klinefelter, Down, Cat – Cry, patus. ii) Inborn errors of metabolism – Phenylketonuria (PKU), Alkaptonura, Albinism. iii) Human pedigree analysis with symbols. 2) Nature and functions of genetic materials. i) DNA – structure, functions and replications ii) RNA – Structure, types and functions. iii) Genetic code</p>	<p>Extend the Human Genetics with respect to Inborn errors of metabolism. Outline of Nature and functions of genetic materials.</p>

Specify Course Outcome: Learn and interpret the basic concepts of Heredity and Variation of Genetics.

Specify Program Outcome: Explain and clarify animals anatomy, physiology, endocrinology, biochemistry, histology, genetic, genetic engineering technique and evolution also practice histo-techniques and haematology.

Signature of Teacher



Dnyanopasak Shikshan Mandal's
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Pro-forma for program and course outcomes (2.6.1)

Name of Teacher: Kachave S. E.

Department: ZOOLOGY

Program: BSc SY

Subject: Zoology

Course Code: CCZ III (B)

Paper Title: COMPARATIVE ANATOMY AND PHYSIOLOGY (P-VII)

Unit Number	Unit Name	Topics	Unit-wise Outcome
I	1) Comparative Anatomy of Vertebrates	i) Integument ii) Heart iii) Kidney	classify and compare anatomical feature
II	1) Enzyme 2) Nutritions	i) Nature and Classification of enzymes. ii) Mechanism of enzyme action. iii) Factors affecting on enzymes activity i) Digestion of carbohydrates, proteins and lipids. ii) Vitamins – Fat soluble and Water soluble vitamins (Sources, deficiency diseases and effects	Name and classify Enzyme and nutrition
III	1) Respiration	i) Definition of Aquatic and Aerial respiration. ii) Respiratory organs in man. iii) Mechanism of respiration.	Explain ,functions of respiratory system

	2) Circulation	iv) Transport of O ₂ and CO ₂ Blood – composition and functions. ii) Structure and working of heart. iii) E.C.G. and Blood Pressure. iv) Blood clotting.	Explain and analyse blood and heart and their different conditions.
IV	1) Excretion 2) Nerve Physiology 3) Muscle Physiology	i) Modes of excretion in animals (Ammonotelism, Ureotelism and Uricotelism) ii) Structure of kidney (V.S.) iii) Structure of uriniferous tubules. iv) Physiology of urine formation. v) Composition of urine. i) Structure and types of neurons. ii) Structure of synapse. iii) Conduction of nerve impulse i) Types of muscles- smooth muscles, skeletal muscles and cardiac muscles. ii) Ultra structure of skeletal muscles.	Define and explain excretion . Label and analyse structure and functions of kidney. Explain neural system. Explain muscle physiology.

Specify Course Outcome: Learn and interpret the animal anatomy and physiology.

Specify Program Outcome Explain and clarify animals anatomy, physiology, endocrinology, biochemistry, histology, genetic, genetic engineering technique and evolution also practice histo-techniques and haematology.

Signature of Teacher



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Pro-forma for program and course outcomes (2.6.1)

Name of Teacher: Tanveer Kausar SK. A.H.

Department: **Zoology**

Program: B.Sc. SY

Subject: **Zoology**

Course Code: **CCZ IV (Section A)**

Paper Title:-VIII- GENETIC ENGINEERING AND EVOLUTION

Unit Number	Topics	Unit-wise Outcome
I	1) Introduction of Genetic Engineering 2) Recombinant DNA Technology i) Tools: - A) Enzymes: - a) Lysing b) Ligases c) Nucleases (Exonucleases, Endonucleases, Restriction Endonucleases) d) Synthetases (DNA polymerase, Reverse transcriptase) B) Vectors: - Cloning vectors (Plasmid -psBR322, Bacteriophage-Lambda phage, Virus-SV40, Cosmid vectors) 3) Techniques: - i) Gel-Electrophoresis ii) PCR (Polymerase Chain Reaction) iii) Southern, Northern and Western Blotting.	Learn and understand Recombinant DNA Technology and other techniques of Genetic Engineering.
II	1) Construction of rDNA 2) c-DNA libraries and Genomic libraries 3) Transgenesis and Transgenic animals (Transgenic cattle, sheep, pig and fish) 4) Cloning and cloned animals (Dolly sheep) 5) DNA fingerprinting	Extend the knowledge of Construction of rDNA and Transgenic animals.

III	1) Concept of Evolution 2) Theories of organic evolution i) Lamarck's theory ii) Darwin's theory iii) Modern synthetic theory-Neo-Darwinism iv) Hugo De Vries theory	Interpret the concepts of evolution relate to Theories of organic evolution.
IV	1) Evidences of organic evolution a) Anatomical b) Embryological c) Paleontological d) Biochemical 2) Adaptations:-Aquatic, Terrestrial, Fossorial, Volant and Desert. 3) Hardy-Weinberg's law	Identify the evolutionary evidences. Illustrate the animal adaptation to their environment.

Specify Course Outcome: Gain the better knowledge of advance techniques of Genetic Engineering and Concept of Evolution.

Specify Program Outcome: Specify Program Outcome: Explain and clarify animals anatomy, physiology, endocrinology, biochemistry, histology, genetic, genetic engineering technique and evolution also practice histo-techniques and haematology.

Signature of Teacher



Dnyanopasak Shikshan Mandal's
College of Arts, Commerce and Science, Parbhani

Pro-forma for program and course outcomes (2.6.1)

Name of Teacher: Kachave S. E.

Department: Zoology

Program: BSc SY

Subject: Zoology

Course Code: CCZ IV (Section B)

Paper Title: ENDOCRINOLOGY, HISTOLOGY AND BIOCHEMISTRY: IX

Unit Number	Unit Name	Topics	Unit-wise Outcome
I	1) Endocrinology	i) Pituitary gland ii) Thyroid gland iii) Adrenal gland iv) Islet's of Langerhans (Pancreas) v) Menstrual Cycle.	Define, label and explain endocrine glands.
II	1) Histology of mammalian organs and tissues.	i) Stomach ii) Intestine iii) Pancreas iv) Liver v) Kidney vi) Testes vii) Ovary.	Define , explain histology of mammalian organs and tissue.
III	1) Carbohydrate metabolism	i) Glycogenesis, Glycogenolysis and Gluconeogenesis ii) Glycolysis iii) Krebs's cycle	Define and explain cellular respiration.
IV	1) Protein metabolism 2) Lipid metabolism	i) Deamination and Transamination ii) Ornithine cycle i) B-Oxidation ii) Ketosis, Ketogenesis and Ketolysis.	Define and explain protein and lipid metabolism.

Specify Course Outcome: Learn and Interpret the endocrine system , histology and biochemistry

Specify Program Outcome: Explain and clarify animals anatomy, physiology, endocrinology, biochemistry, histology, genetic, genetic engineering technique and evolution also practice histo-techniques and haematology.

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Pro-forma for program and course outcomes (2.6.1)

Name of Teacher: Hasekar A. S.

Department: Zoology

Program: BSc SY Subject: Zoology

Course Code: CCZP II

Paper Title: Practical Paper: Genetics, Genetic Engineering and Evolution-P X

Unit Number	Topics	Unit-wise Outcome
I	<ol style="list-style-type: none">1. Problems based on Monohybrid and Dihybrid cross.2. Problems based on interaction of genes (Complementary, Supplementary, Inhibitory Duplicate factors)3. Problems based on blood group inheritance in man.4. Problems based on sex linked inheritance.5. Culture of Drosophila and its observation of genetic characters like eyes and wings.6. Preparation of temporary slides of salivary gland chromosomes from chironomous larva .7. Study of permanent slide of sickle cell anaemia.8. Study of chromosomal abnormalities in man with the help of photographs/charts and Karyotypes<ol style="list-style-type: none">a) Down's syndromeb) Klinefelter's syndromec) Turner's syndrome9. Human pedigree analysis- various symbols used.10. Estimation of DNA by Diphenyl amine (DPA method)11. Study of human genetic traits (Rolling tongue, Length of index and ring finger, ear lobes) by using Hardy Weinberg's principle.12. Calculation of frequencies of recessive and dominant gene in a population by using Hardy Weinberg Principle.13. Calculation of heterozygote and homozygote in population by using Hardy Weinberg's principle.14. Study of evidences by using photograph/charts and models<ol style="list-style-type: none">a) Analogous and Homologous organsb) Connecting link (Peripatus and Archaeopteryx)c) Embryological evidences	Solve the problems based on Genetics and explain the various types of genetic diseases and Evolutionary study.

	15. Study of adaptations (Museum Specimens).	
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Specify Course Outcome: Solve the problems based on Genetics and explain the various types of genetic diseases and compare the various evolutionary links.

Specify Program Outcome: Explain and clarify animals anatomy, physiology, endocrinology, biochemistry, histology, genetic, genetic engineering technique and evolution also practice histo-techniques and haematology.

Signature of Teacher



Dnyanopasak Shikshan Mandal's

College of Arts, Commerce and Science, Parbhani

Pro-forma for program and course outcomes (2.6.1)

Name of Teacher: Hasekar A. S.

Department: Zoology

Program: BSc SY

Subject: Zoology

Course Code: Practical Paper: CCZP III

Paper Title: Comparative Anatomy and Physiology, Endocrinology, Histology and Biochemistry-XI

Unit Number	Topics	Unit-wise Outcome
I	<ol style="list-style-type: none">1) Qualitative detection of digestive enzymes (Protease, Amylase and Lipase) in cockroach.2) Detection of human salivary amylase.3) Estimation of oxygen consumption in fish or any other suitable aquatic animal.4) R.B.C. counting.5) W.B.C. counting.6) Estimation of Haemoglobin.7) Detection of blood groups.8) Measurement of B.P. by using B.P. apparatus (Demonstration only).9) Qualitative detection of nitrogenous waste products (Ammonia, Urea, Uric acid) in bird's excreta and urine of Mammals.10) Preparation of Haematin crystals.11) Temporary preparation of squamous epithelium, ciliated epithelium, skeletal muscle fiber and blood smear.12) Study of histological structure of following organs – stomach, intestine, pancreas, liver, kidney, testis, ovary, thyroid and pituitary.13) Structure of synapse, structure of neurons (slide/chart)14) Types of nerve cells - Unipolar, Bipolar, Multipolar (Slides)15) Location of endocrine glands through charts or models.16) Preparation of block.17) Compulsory educational excursion tour to visit various zoological important centres	To explain, perform, identify, demonstrate histological slide, endocrine glands, blood, human physiological conditions, biochemical juices.

Specify Course Outcome: Comparative study of anatomy and physiology and Histological study of various endocrine glands and tissues and its composition of various biomolecules.

Specify Program Outcome: Explain and clarify animals anatomy, physiology, endocrinology, biochemistry, histology, genetic, genetic engineering technique and evolution also practice histo-techniques and haematology.

Signature of Teacher



Dnyanopasak Shikshan Mandal's
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Pro-forma for program and course outcomes (2.6.1)

Name of Teacher: Kachave S. E.

Department: ZOOLOGY

Program: B.Sc.S.Y.

Subject: ZOOLOGY

Course Code: SECZ – I (A)

Paper Title: HAEMATOLOGY

Unit Number	Topics	Unit-wise Outcome
I	1. Introduction - Definition, Components, Cells – Structure and Functions of cells, Lymph. - Collection of Blood- Collection of capillary blood by skin puncture, Collection of blood by Venipuncture, Collection of arterial blood, Criteria for sample collection. • Practical – Collection of blood by Venipuncture and arterial blood.	Define, explain and analyse of blood.
II	2. Anticoagulants - Definition, Action of E. D. T. A., Oxalates, double oxalates, fluorides, acid citrate, detxtrose-trisodium citrate, heparin. - Effect of anticoagulants on blood cell morphology. 3. Haemoglobin - Normal structure and various haemoglobin, Determination of haemoglobin by various methods. - Anaemia. • Practical – Determination of haemoglobin from given blood sample, Clotting and bleeding time of blood.	Define, explain and analyse of clotting factors in blood.

III	4. Study of Blood Cell Count - Total WBC Count, Total RBC Count, Platelets Count, Absolute Eosinophil Count, Reticulocyte Count. • Practical – Determination of Total Count of RBC, WBC.	Define, explain and analyse of numbers of blood cells.
IV	5. Study of Blood Smear for differential WBC Count - Preparation and Staining of smears, Counting Methods, Morphology of White cells, Types of White Cells, Abnormalities in morphology of blood cells and related diseases. • Practical – Determination of differential WBC Count by blood Smear	Define, explain and analyse of types of white blood cells.

Specify Course Outcome: Understanding and analyse blood, blood factors numbers and types of blood cells.

Specify Program Outcome: Explain and clarify animals anatomy, physiology, endocrinology, biochemistry, histology, genetic, genetic engineering technique and evolution also practice histo-techniques and haematology.

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Pro-forma for program and course outcomes (2.6.1)

Name of Teacher: Kachave S. E.

Department: ZOOLOGY

Program: BSc. S.Y.

Subject: ZOOLOGY

Course Code: SECZ – II(C)

Paper Title: Histotechnology.

Unit Number	Topics	Unit-wise Outcome
I	1. Introduction – Definition of Histotechnology 2. Methods of examination of tissues and cells, Collection and labeling of specimens, Methods of preparation and examination of tissues (fresh and fixed tissue)	Define, explain and analyse of Histotechnology techniques
II	3. Fixation of tissue - Definition, Criteria for an ideal fixative, types (Simple and Compound), Properties of Simple and Compounds fixatives (Microanatomical, cytological and histochemical) • Practical – Isolation and collection of tissue, fixing and block preparation	Define, explain and analyse of tissue fixation technique.
III	4. Tissue processing - Manual and automatic tissue processing, Different embedding media, Steps of tissue processing (Dehydration, Clearing, Impregnation). 5. Embedding- Methods of Embedding, Embedding medium, names of medium and	Explain and analyse section processing and embedding method.

	moulds, Automatic Tissue Processes (Structure and Working, Advantages and Disadvantages). • Practical – Tissue processing of prepared blocks.	
IV	6. Section Cutting - Types of Microtome, Rotary Microtome -Parts and their functions, Microtome Knives- Types, Care and Maintenance Techniques of sharpening; Technique of Section Cutting, Preparation of Adhesive Mixture, Mounting. 7. Staining - Definition and Significance of Staining, Stain and Staining Types, Theory of Staining, Methods of Staining. • Practical – Section Cutting, fixing, alcohol grading, staining and preparation of permanent slide.	Explain and analyse section cutting and staining method.

Specify Course Outcome: Understand, analyse and practice of histo-techniques and use of microtome

Specify Program Outcome: Explain and clarify animals anatomy, physiology, endocrinology, biochemistry, histology, genetic, genetic engineering technique and evolution also practice histo-techniques and haematology.

Signature of Teacher



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Pro-forma for program and course outcomes (2.6.1)

Name of Teacher: Mr. Shaikh Ubaid S. K. Masood.

Department: Zoology.

Program: B. Sc. T. Y.

Subject: Zoology.

Course Code: DSEZ-I.

Paper Title: ECOLOGY AND ZOOGEOGRAPHY- P-XII.

Unit Number	Unit Name	Topics	Unit-wise Outcome
1	I	1. Ecology-Introduction and Scope of Ecology 2. Introduction to Ecosystem 2.1. Components of an ecosystem a) Abiotic components – Light, Temperature & Water b) Biotic components – Producers, Consumers & Decomposers. 2.2. Types of Ecosystem- Aquatic- Pond ecosystem. Terrestrial- Desert Ecosystem. 2.3. Food Chain, Food Web, Ecological Pyramids. 2.4. Energy Flow in an Ecosystem. 3. Bio-geochemical Cycles 3.1. Gaseous Cycle- Oxygen Cycle 3.2. Sedimentary Cycle- Sulphur Cycle 4. Spheres of Earth 4.1. Atmosphere 4.2. Lithosphere 4.3. Hydrosphere 4.4. Biosphere 4.5. Ecological Succession-, Trends, Basic Types, Hydrarch and Xerarch	Explain Interactions of organisms with their environments and consequences of these interactions on ecosystem dynamics.
2	II	1. Population Ecology – Characteristics of Population 1.1 Natality 1.2 Mortality 1.3 Population Dispersal 1.4 Population density	Illustrate inter-relationship between individuals in population and communities.

		<p>1.5 Age distribution 1.6 Population Growth Form 1.7 Population Equilibrium and Fluctuation 13 2. Biotic interactions 2.1 Positive interactions – Commensalism, Mutualism 2.2 Negative interactions – Competition, Predation, Parasitism</p>	
3	III	<p>1. Pollution – Sources, Effects and Control 1.1 Air Pollution 1.2 Water Pollution 1.3 Noise Pollution 2. Energy Resources 2.1 Conventional energy resources and their limitations 2.1.1 Fossil Fuels 2.1.2 Nuclear Power 2.1.3 Hydel Power 2.2 Non-conventional energy resources – Advantages, Limitations & Latest developments 2.2.1 Solar Energy 2.2.2 Wind Energy 2.2.3 Tidal Energy</p>	Explain of the current environmental issues with ecological concepts involved.
4	IV	<p>1. Adaptations 1.1 Aquatic Adaptations 1.2 Desert Adaptations 1.3 Volant Adaptations 2. Wildlife Conservation and Endangered Species 2.1 Aims & necessity of wildlife conservation 2.2 Wild life and Endangered species of India 2.3 Measures to protect endangered species in India 2.4 Sanctuaries and National parks in India 3. Zoogeographical Realms – Physical features and fauna of following Realms in Brief. 3.1 Oriental Realm 3.2 Australian Realm</p>	Inspect structural adaptations; conservation and management of natural resources

Specify Course Outcome: Explain, illustrate and inspect ecological systems, pollution, resource management and their relationship and impact on life forms.

Specify Program Outcome: Explain and illustrate ecological, ethological and parasitological aspects also practice techniques of biostatistics, Bio-informatics, vermicomposting and aquarium keeping.

Signature of Teacher



Dnyanopasak Shikshan Mandal's
College of Arts, Commerce and Science, Parbhani

Pro-forma for program and course outcomes (2.6.1)

Name of Teacher: Dr. Shivaji B. Pawar.

Department: Zoology.

Program: BSc TY. Subject: Zoology.

Course Code: DSEZ-I

Paper Title: APPLIED PARASITOLOGY – I, P-XIII (B)

Unit Number	Unit Name	Topics	Unit-wise Outcome
1	I	1. Introduction to Parasitology : 1.1 Brief introduction of Parasitology, Parasitism, Parasite, Host, Vector, Host parasite relationship. 1.2 Scope and Branches of Parasitology. 2. Parasitic Protozoa: Classification and general organization of parasitic Protozoa 3. Study of Systematic Position, Geographical distribution, Morphology, Life Cycle, Pathogenicity, Diagnosis, Prophylaxis and Treatment of 1. <i>Entamoeba histolytica</i> , 2. <i>Giardia intestinalis</i> , 3. <i>Trichomonas vaginalis</i>	Define and Explain basics in parasitology and classify parasitic protozoans.
2	II	Study of Systematic Position, Geographical distribution, Morphology, Life Cycle, Pathogenicity, Diagnosis, Prophylaxis and Treatment of 1. <i>Trypanosoma gambiense</i> 2. <i>Balantidium coli</i> 3. <i>Sarcocystis cruzi</i> , 4. <i>Plasmodium vivax</i> 5. <i>Eimeria tenella</i>	Explain diseases caused by parasitic protozoans.
3	III	Parasitic Platyhelminthes: Trematodes 1. Introduction, Classification, General	Explain parasitic diseases caused by Trematodes.

		<p>organization of Trematodes.</p> <p>2. Study of Systematic Position, Geographical distribution, Morphology, Life Cycle, Pathogenicity, Diagnosis, Prophylaxis and Treatment of</p> <p><i>i. Schistosoma haematobium.</i></p> <p><i>ii. Paragonimus westermani.</i></p> <p><i>iii. Gastrodiscoides hominis.</i></p> <p>3. Parasitic adaptations in Trematodes.</p> <p>4. Larval forms in Trematodes.</p>	
4	IV	<p>Parasitic Platyhelminthes: Cestodes</p> <p>1. Introduction, Classification, General organization of Cestodes.</p> <p>2. Study of Systematic Position, Geographical distribution, Morphology, Life Cycle, Pathogenicity, Diagnosis, Prophylaxis and Treatment of</p> <p><i>i. Taenia saginata.</i></p> <p><i>ii. Taenia solium</i></p> <p><i>iii. Echinococcus granulosus.</i></p> <p>3. Parasitic adaptations in Cestodes</p> <p>4. Larval forms in Cestodes</p>	Explain parasitic diseases caused by cestodes.

Specify Course Outcome: Outline information and diseases of parasitic protozoans and helminths.

Specify Program Outcome: Explain and illustrate ecological, ethological and parasitological aspects also practice techniques of biostatistics, Bio-informatics, vermicomposting and aquarium keeping.

Signature of Teacher



Dnyanopasak Shikshan Mandal's
College of Arts, Commerce and Science, Parbhani

Pro-forma for program and course outcomes (2.6.1)

Name of Teacher: Mr. Shaikh Ubaid S. K. Masood.

Department: Zoology.

Program: B.Sc. T. Y.

Subject: Zoology.

Course Code: DSEZ-II.

Paper Title: Ethology, Biometry and Bioinformatics: P-XIV

Unit Number	Unit Name	Topics	Unit-wise Outcome
1	Ethology	1. Classification of Animal Behavior- 1.1. Inborn or stereotyped animal behavior – Taxis and Instincts with examples. 1.2. Acquired animal behavior – Imprinting, Conditioning, Habituation, Reasoning. 1.3 Social Behaviour in Insects –Honeybee.	Explain basic sense of different behaviors.
2	Ethology	1. Communication in animals 1.1 Auditory Communication 1.2 Chemical Communication 1.3 Visual Communication 1.4 Tactile Communication 2. Mimicry and Colouration 2.1 Types of Mimicry- Protective and Aggressive 2.2 Types of Colouration- Protective, Aggressive and Warning	Classify sensory systems with their intelligence.
3	Biometry	1. Collection and Classification of Data 1.1 Methods of collection of data 1.2 Types of classification of data - Geographical, Chronological, Quantitative, Qualitative, Continuous, Discontinuous. 2. Measures of Central Tendency	Define basic statistical techniques useful in biological studies.

		Arithmetic Mean, Median and Mode 3. Graphic Representation of Data 1.1 Histogram 1.2 Pie Diagram 1.3 Polygon Frequency Curve	
4	Bioinformatics	1.1 Computer and their Applications in Biology 1.2 Internet and its Uses 1.3 World Wide Web 1.4 Search Engines 1.5 Broad Applications of Bioinformatics 1.6 Introduction to Biological Database a) NCBI b) Pub Med	Explain internet and web browsers.

Specify Course Outcome: define, explain and classify animal behavior, statistical techniques and internet.

Specify Program Outcome: Explain and illustrate ecological, ethological and parasitological aspects also practice techniques of biostatistics, Bio-informatics, vermicomposting and aquarium keeping.

Signature of Teacher



Dnyanopasak Shikshan Mandal's
College of Arts, Commerce and Science, Parbhani

Pro-forma for program and course outcomes (2.6.1)

Name of Teacher: Dr. Shivaji B. Pawar.

Department: Zoology.

Program: B. Sc. T. Y.

Subject: Zoology.

Course Code: DSEZP-II.

Paper Title: APPLIED PARASITOLOGY – II: P-XV (B).

Unit Number	Unit Name	Topics	Unit-wise Outcome
1	Parasitic Nematodes: Animal Nematodes	1. Introduction, Classification, General organization of Animal Nematodes. 2. Study of Systematic Position, Geographical distribution, Morphology, Life Cycle, Pathogenicity, Diagnosis, Prophylaxis and Treatment of- <i>1. Enterobius vermicularis</i> <i>2. Ancylostoma duodenale.</i> <i>3. Wuchereria bancrofti.</i> 3. Larval forms in Animal Nematodes	Identify and explain animal nematodes.
2	Parasitic Nematodes: Plant Nematodes	1. Introduction, Classification, General organization of Plant Nematodes 2. Study of Systematic Position, Geographical distribution, Morphology, Life Cycle, Pathogenicity, Diagnosis, Prophylaxis and Treatment of- <i>1. Meloidogyne</i> (Root knot nematode), <i>2. Heterodera</i> (Cyst nematode)	Identify and explain plant nematodes.

		3. <i>Tylenchulus</i> (Citrus nematode)	
3	Parasitic Arthropodes	1. Systematic Position, Geographical Distribution, Morphology, Life Cycle, diseases and Control Measures of – i. Acarina-Ticks & Mites. ii. Parasitic Hemiptera -Bed Bug (<i>Cimex lacturalis</i>) 2. Parasitic flies-Outline Classification, Morphology, role as vectors of Human diseases and Control Measures of House Fly (<i>Musca domestica</i>), Bot Fly (<i>Dermatobia hominis</i>)	Identify and explain parasitic arthropods.
4	Insect Vectors	Morphology, pathogenecity and Control Measures of – i) <i>Siphonaptera</i> ii) <i>Anopleura</i> iii) <i>Mallophaga</i> iv) <i>Hymenoptera</i> 2. Mosquitoes as a vector in the transmission of Malaria, Dengue fever, Elephantiasis, Yellow Fever, Chikungunia and their control measures 3. Chemical and Biological Control of Insets.	Identify and explain mosquito-borne parasitic diseases.

Specify Course Outcome: Identify and explain various parasitic diseases with causative organisms.

Specify Program Outcome: Explain and illustrate ecological, ethological and parasitological aspects also practice techniques of biostatistics, Bio-informatics, vermicomposting and aquarium keeping.

Signature of Teacher



Dnyanopasak Shikshan Mandal's
College of Arts, Commerce and Science, Parbhani

Pro-forma for program and course outcomes (2.6.1)

Name of Teacher: Mr. Shaikh Ubaid S. K. Masood.

Department: Zoology.

Program: B. Sc. T. Y.

Subject: Zoology

Course Code: DSEZP-I.

Paper Title: Ecology, Zoogeography Ethology, Biometry and Bioinformatics: Practical Paper- XVI.

Unit Number	Unit Name	Topics	Unit-wise Outcome
1	Ecology	1. Estimation of Dissolved O ₂ from Water Sample. 2. Estimation of Dissolved CO ₂ from Water Sample. 3. Estimation of Population Density from Water Sample/ Terrestrial area. 4. Determination and study of Atmospheric Humidity. 5. Study of positive and negative interactions (biotic interaction) in animals. 6. Estimation of Chlorides, Salinity, Hardness from given water sample for Water quality status 7. Ecological Adaptations (Any two examples from each to be studied) a) Volant Adaptations. b) Aquatic Animals (from fresh water and marine environment). c) Desert Animals. 8. Report on a Field Visit to Zoo Park/National Park/Biodiversity Park/Wild Life Sanctuary to study management, behavior and enumeration of wild animals.	Analyse abiotic factors and adaptations in ecosystem.
2	Zoogeography	1. Museum study of Vertebrate Endangered Species or Threatened Wild Animals on the	Categorise endangered species and

		Basis of charts/ models/ photographs (Any Five). 2. Identification of Zoogeographical Realms from the Map and Identify Specific Fauna of Respective Regions.	zoogeographical realms.
3	Ethology	1. To study the Positive and Negative Phototropism with suitable examples. 2. To study the Positive and Negative Chemotactic Response with suitable examples. 3. Study of Colouration of animals with suitable examples.	Demonstrate animal behavior.
4	Biometry	1. Problems Based on Mean, Mode, Median. 2. Classification of Data- i) Histogram, ii) Pie-Diagram, iii) Polygon Frequency Curve.	Interpret and construct biological data.
5	Bioinformatics	1. To perform online search on Biological information/Literature 2. How to access the biological data from NCBI and Pub Med 3. BLAST- Sequence Search & alignment.	Analyse biological data online.

Specify Course Outcome: Analyse and demonstrate ethology, ecosystem and interpretation of biological data via statistical techniques and internet.

Specify Program Outcome: Explain and illustrate ecological, ethological and parasitological aspects also practice techniques of biostatistics, Bio-informatics, vermicomposting and aquarium keeping.

Signature of Teacher



Dnyanopasak Shikshan Mandal's
College of Arts, Commerce and Science, Parbhani

Pro-forma for program and course outcomes (2.6.1)

Name of Teacher: Dr. Shivaji B. Pawar.

Department: Zoology.

Program: BSc TY

Subject: Zoology.

Course Code: DSEZP-II.

Paper Title: Applied Parasitology {XVII (B)}.

Unit Number	Unit Name	Topics	Unit-wise Outcome
1	I	<p>1 Identification, classification and description of Protozoan Parasites through permanent slides/photomicrographs</p> <p><i>i. Entamoeba histolytica,</i> <i>ii. Giardia intestinalis,</i> <i>iii. Trichomonas vaginalis</i> <i>iv. Trypanosoma gambiense</i> <i>v. Balantidium coli</i> <i>vi. Sarcocystis cruzi,</i> <i>vii. Plasmodium sp.</i> <i>viii. Eimeria tenella</i></p> <p>2 Collection, staining, identification and description of Parasitic protozoa from Blood sample or rectal contents of suitable animals –</p> <p><i>i. Ciliates,</i> <i>ii. Flagellates,</i> <i>iii. Malarial parasites,</i> <i>iv. Coccidian Parasites</i></p> <p>3 Identification, classification and description of Parasitic platyhelminths through permanent slides/photomicrographs or specimens -</p> <p><i>i. Schistosoma haematobium</i> <i>ii. Fasciola hepatica</i> <i>iii. Paragonimus westermani.</i> <i>iv. Gastrodiscoides hominis</i></p>	<p>Able to identify, classify parasites and practice mounting of parasites.</p>

	<p>v. <i>Taenia saginata</i>, vi. <i>Taenia solium</i> vii. <i>Echinococcus granulosus</i> viii. <i>Diphyllobothrium lattu</i></p> <p>2. Collection, Preservation, Staining, Mounting, identification and description of Trematodes and Cestodes from locally available different hosts (Gills & intestines).</p> <p>3. Identification, classification and description of Parasitic Nematodes (Animals & Plants) through permanent slides/photomicrographs or specimens –</p> <p>i. <i>Enterobius vermicularis</i> ii. <i>Ancylostoma duodenale</i>. iii. <i>Ascaris lumbricoides</i> iv. <i>Wuchereria bancrofti</i>. v. <i>Meloidogyne</i> (Root knot nematode), vi. <i>Heterodera</i> (Cyst nematode) vii. <i>Tylenchulus</i> (Citrus nematode) viii. <i>Anguina</i> (Seed Gall- nematode)</p> <p>6. Collection, Preservation, Mounting, identification and description of Animal Nematodes from locally available different hosts (intestines).</p> <p>7. Collection, Preservation, Mounting, identification and description of Plant Nematodes from soil samples.</p> <p>8. Study of following arthropods through permanent slides/ photographs: <i>Aedes, Culex, Anopheles, Pediculus humanus, Xenopsylla cheopis, Cimex lectularius</i> <i>Phlebotomus argentipes, Musca domestica</i>.</p> <p>9 Collection, preservation, Preparation of permanent slides and description of mouth-parts of - House fly ii. Mosquito iii. Bed bug iv. Head louse</p> <p>10. Submission of a brief report on parasites of vertebrates.</p>	
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Specify Course Outcome: Identify, classify parasites and practice mounting of parasites.

Specify Program Outcome: Explain and illustrate ecological, ethological and parasitological aspects also practice techniques of biostatistics, Bio-informatics, vermicomposting and aquarium keeping.

Signature of Teacher



Dnyanopasak Shikshan Mandal's
College of Arts, Commerce and Science, Parbhani

Pro-forma for program and course outcomes (2.6.1)

Name of Teacher: Tanveer Kausar SK. A.H.

Department: Zoology

Program: B.Sc. TY

Subject: Zoology

Course Code: SECZ –III (F)

Paper Title: VERMICULTURE AND VERMICOMPOSTING

Unit Number	Topics	Unit-wise Outcome
I	1. Vermiculture – Definition, History, scope and economic importance. 2. Earthworms-Taxonomic Position and Diversity of different species of earthworms. 3. Eisenia fetida- Systematic position, Morphology and Life cycle. Practicals: 1. To Study different species of earthworms. 2. To Study morphological features of composting earthworm, Eisenia Fetida 3. To study Life cycle of Eisenia Fetida. 4. Identification of Earthworm cocoons and vermi casts	Identify and classify the different species of earthworm in reference of Vermiculture.
II	1. Common species for Vermiculture; Environmental requirements; culture methods 2. Applications of Vermiculture. 3. Earthworm Pests and Diseases. Practicals: 1. Collection and identification of common species of earthworms for vermiculture. 2. Study of Earthworm Pests and diseases.	Learn the environmental requirement, culture and application of Vermiculture.

<p style="text-align: center;">III</p>	<ol style="list-style-type: none"> 1. Vermicomposting Materials 2. Types of vermicomposting: <ol style="list-style-type: none"> a) Small Scale Vermicomposting b) Large Scale Vermicomposting 3. Methods of Vermicomposting: Bed Method, Pit Method. 4. Phases and Steps of Vermicomposting. <p>Practicals:</p> <ol style="list-style-type: none"> 1. Study of Vermicompost equipments, devices. 2. Preparation of Vermibeds. 3. Demonstration of preparation pit method. 4. Preparation of vermicomposting pits at local area (college or home gardens) 	<p>Construct the vermicomposting unit by using different methods of Vermiculture.</p>
<p style="text-align: center;">IV</p>	<ol style="list-style-type: none"> 1. Harvesting 2. Nutrient Content of Vermicompost 3. Advantages of Vermicompost 4. Vermiwash, Preparation and Applications 5. Prospects of vermi-culture as self-employment venture <p>Practicals:</p> <ol style="list-style-type: none"> 1. Collection of vermiwash and use of vermiwash. 2. To study the effect of vermicompost on any plant. 3. Visit to Agricultural Farm/Field to nearby Krishi Vidnyan Kendra to study vermicultures and vermicomposting Units. 	<p>Practice and harvest the vermicomposting and vermiwash.</p>

Specify Course Outcome: Apply and analyse the practice of Vermiculture and their application.

Specify Program Outcome: Explain and illustrate ecological, ethological and parasitological aspects also practice techniques of biostatistics, Bio-informatics, vermicomposting and aquarium keeping.

Signature of Teacher



Dnyanopasak Shikshan Mandal's
College of Arts, Commerce and Science, Parbhani

Pro-forma for program and course outcomes (2.6.1)

Name of Teacher: Tanveer Kausar SK. A.H.

Department: Zoology

Program: B.Sc. TY

Subject: Zoology

Course Code: SECZ –IV (G)

Paper Title: AQUARIUM KEEPING

Unit Number	Topics	Unit-wise Outcome
I	Introduction to Aquarium Keeping, Aquarium – Definition, Shape and size Types of aquarium- wooden, Steel, fibre glass, plastic acrylic, iron frame, full glass, garden pool etc. Practicals: 1. To study different types of aquarium 2. Visit to Aquaria	Outline the concept of Aquarium and their types.
II	Construction of aquarium Design and fabrication Materials - Aluminum/ Iron angle, Hack saw, blade, drilling machine, Hammer, glass, glass cutter, tape, file, set square, angle cutter, sticky tape, aquarium cement, silicon tube, silicon gun etc. Practicals: 1. Angle cutting for frame of aquarium. 2. Rivetting of angle to form a side of aquarium. 3. Fixing of glass of one side in the frame of aquarium with the help of bitumen/ aquarium cement / silicon etc. 4. Cutting of glasses of given size	Construct and design the Aquarium by using accessories.

<p style="text-align: center;">III</p>	<p>Setting of Aquarium-</p> <ul style="list-style-type: none"> - Selection of place for aquarium, table or stand, cover for aquarium, light, watering, planting, preparation of bed-sand, gravels, rocks, coarals, back glass painting or poster, Aquarium accessories- Aerator, air-stone, toys, filtration, hand net, rubber tube and connectors. Thermometer, heater etc. <p>Practicals:</p> <ol style="list-style-type: none"> 1. Identification of various aquarium tools 2. Identification of various aquarium accessories 3. Preparation of aquarium bed. 4. Watering of aquarium 5. Planting of aquarium 6. Lighting of aquarium 	<p>Organise the new idea of aquarium setting.</p>
<p style="text-align: center;">IV</p>	<p>Maintenance</p> <ul style="list-style-type: none"> - Water parameters/ test and monitor, cycling of water. - Cleaning of aquarium, light management - Food of feeding- live food and dry food/ - Preparation of supplementary food for aquarium fishes. - Aquarium fishes - Significance of aquarium. <p>Practicals:</p> <ol style="list-style-type: none"> 1. Cleaning of aquarium 2. Identification of aquarium fishes 3. Preparation of supplementary food from grains for aquarium fishes 4. Checking fish health 5. Marketing 	<p>Build and develop the methods of maintenance of aquarium.</p>

Specify Course Outcome: Learn and use skill of design and develop aquarium.

Specify Program Outcome: Explain and illustrate ecological, ethological and parasitological aspects also practice techniques of biostatistics, Bio-informatics and aquarium keeping.

Signature of Teacher

