|| JAI SRI GURUDEV ||

SRI ADICHUNCHANAGIRI FIRST GRADE COLLEGE

C R PATANA-573116.

Department of Zoology

LESSION PLAN FOR THE ACADEMIC YEAR 2023-24(NEP)

(Annexure-1.2) Criterion 01 (Metric- 1.1.1)

Paper name: Cytology, Genetics and Infectious diseases

Programme : B.Sc. Hons

Class : I SEM (DSC) **Total Hours: 56 hours**

Name of the faculty : MN and KMR

Duration : September to December

Sl.No.	Topics Covered	No. of Lecture Hours	Methodology/ pedagogy	Time period
01.	**Chapter 1.** **Structure and Function of Cell Organelles** I in Animal cell. **Plasma membrane:** chemical structure-lipids and proteins. **Endomembrane system**: protein targeting and sorting, transport, endocytosis and exocytosis. **Chapter 2.** Structure and Function of Cell Organelles II in Animal Cell. **Cytoskeleton:** microtubules, microfilaments, intermediate filaments. **Mitochondria**: Structure, oxidative phosphorylation; electron transport system. **Peroxisome and Ribosome:** structure and function.	14	Lectures/Videos / Seminars/Project/ Group discussion/ Assignment	01/09/2023 to 30/10/2023
02.	**Capter 3.** **Nucleus and Chromatin Structure -** Structure and function of nucleus in eukaryotes, Chemical structure and base composition of DNA and RNA, DNA supercoiling, chromatin organization, structure of chromosomes, Types of DNA and RNA. **Chapter 4.** **Cell cycle, Cell Division and Cell Signaling -Cell division:** mitosis and meiosis, Introduction to Cell cycle and its regulation, apoptosis , **Signal transduction**: intracellular 11 signaling and cell surface receptors, via G-protein linked receptors, **Cell-cell interaction**: cell adhesion molecules,	14	Lectures/Videos / Seminars/Project/ Group discussion/ Assignment	01/11/2023 to 10/12/2023

	cellular junctions			
03.	**Chapter 5**. **Mendelism and Sex Determination** **Basic principles of heredity:** Mendel's laws-monohybrid cross and hybrid cross, Complete and Incomplete Dominance, Penetrance and expressivity, Genetic Sex-Determining Systems, Environmental Sex Determination, Sex Determination and mechanism in Drosophilamelanogaster. Sex-linked characteristics in humans and dosage compensation. **Chapter 6**. **Extensions of Mendelism, Genes and Environment Extensions of Mendelism:** Multiple Alleles, Gene Interaction. **The Interaction Between Sex and Heredity**: Sex-Influenced and Sex-Limited. Characteristics Cytoplasmic Inheritance, Genetic Maternal Effects. **Interaction between Genes and Environment:** Environmental Effects on Gene Expression, Inheritance of Continuous Characteristics.	14	Lectures/Videos / Seminars/Project/ Group discussion/ Assignment	01/09/2023 to 30/10/2023
04.	**Chapter 7.** **Human Chromosomes and Patterns of Inheritance Patterns of inheritance**: autosomal dominance, autosomal recessive, X-linked recessive, X-linked dominant. **Chromosomal anomalies:** Structural and numerical aberrations with examples. Human karyotyping and Pedigree analysis. **Chapter 8.** **Infectious Diseases Introduction to pathogenic organisms:** viruses, bacteria, fungi, protozoa and worms. Structure, life cycle, pathogenicity, including diseases, causes, **symptoms and control of common parasites:** Trypanosoma,Giardia and Wuchereria.	14	Lectures/Videos / Seminars/Project/ Group discussion/ Assignment	01/11/2023 to 10/12/2023

05.	**Revision**	25/12/2023

List of labs to be conducted **56 Hrs.**	
1. Understanding of simple and compound microscopes.	2nd week of Sep
2. To study different cell types such as buccal epithelial cells, neurons, striated muscle cells using 3. Methylene blue/any suitable stain (virtual/ slaughtered tissue).	3rd week of Sep
3. To study the different stages of Mitosis in root tip of Allium cepa.	4th week of Sep
4. To study the different stages of Meiosis in grasshopper testis (virtual).	to
5. To check the permeability of cells using salt solution of different concentrations.	2st week of Oct
6. Study of parasites in humans (e.g. Protozoans, Helminthes in compliance with examples beingstudied in theory) permanent microslides.	3rd week of Oct 4th week of Oct
7. To learn the procedures of preparation of temporary and permanent stained slides, with available mounting material.	
8. Study of mutant phenotypes of Drosophila sp. (from Cultures or Photographs).	1st week of Nov
9. Preparation of polytene chromosomes (Chironomus larva or Drosophila larva).	
10. Preparation of human karyotype and study the chromosomal structural and numerical aberrations from the pictures provided. (Virtual/optional).	2nd week ofNov to
11. To prepare family pedigrees	4th week ofNov 1st week ofDec
12. Revision	2nd to 3rd week of Dec

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LESSION PLAN FOR THE ACADEMIC YEAR 2023-24

(Annexure-1.2) Criterion 01 (Metric- 1.1.1)

Paper name: Molecular Biology, Bioinstrumentation & Techniques in Biology

Programme : B.Sc. Hons (NEP)

Class : III SEM (DSC) **Total Hours: 56 hours**

Name of the faculty : MN and KMR

Duration : September to December

Sl. No	Particulars	No. of Lecture Hours	Methodology /pedagogy	Time period
01.	**Chapter 1:Process of Replication and Transcription** • Fine structure of gene (Cistron, Recon, Muton) • DNA polymerase types and function. • Semiconservative model of replication. • Replication in Prokaryotes (Initiation, Elongation, Termination) • RNA polymerases - types and functions • Transcription in prokaryotes and eukaryotes	08	Lectures/Videos / Seminars/ Group discussion/ Assignment	01/09/2023 to 30/09/2023
02.	**Chapter 2: Process of Translation** • Genetic code and its salient features • Translation in prokaryotes and eukaryotes	06	Lectures/Videos / Seminars/ Group discussion/ Assignment	01/10/2023 to 22/10/2023
03.	**Chapter 3. Regulation of gene expression-I** • Regulation of gene expression in prokaryotes- lac operon (inducible) and trp operon (repressible) in E. coli Regulation of gene expression in eukaryotes - Role of chromatin (euchromatin and heterochromatin) in gene expression Post-transcriptional modification: capping, splicing, polyadenylation• Concept of RNA • editing (mRNA), gene silencing, and, RNA	08	Lectures/Videos / Seminars/ Group discussion/ Assignment	23/10/2023 to 20/11/2023
04.	**Chapter 4. Regulation of gene expression-II** Post-translational modifications: purpose, advantages, and significance; glycosylation,• methylation,	06	Lectures/Videos /	22/11/2023 to 10/12/2023

	phosphorylation, and acetylation. Intracellular protein degradation (lysosomal autophagy and ubiquitin proteosome pathway.		Seminars/Group discussion/ Assignment	
05.	**Chapter 5: Microscopy** Principles and applications of Light microscopy, Dark field microscopy, Phase contrast• microscopy, Fluorescence microscopy, Confocal microscopy and Electron microscopy (SEM and TEM).	09	Lectures/Videos / Seminars/Group discussion/ Assignment	01/09/2023 to 30/09/2023
06.	Chapter 6: Centrifugation and Chromatography Centrifugation: Principles, types, and applications• (High speed and Ultracentrifugation) Chromatography : Principle and applications of: TLC, HPLC and GC•	05	Lectures/Videos / Seminars/Group discussion/ Assignment	01/10/2023 to 22/10/2023
07.	**Chapter 7: Biochemical Instrumentation** Colorimetry and Spectrophotometry: Beer-Lambert'slaw, Absorption spectrum, UV-VL• Spectrophotometer. pH meter, measurement of pH• Principle, applications and safety measures of Radio-tracer techniques - Autoradiography	06	Lectures/Videos / Seminars/Group discussion/ Assignment	23/10/2023 to 15/11/2023
08.	**Chapter 8: Molecular Techniques** Principle and applications of Agarose gel-electrophoresis, SDS-PAGE, DNA Sequencing• (Sanger's Dideoxy method) ,PCR, DNA Fingerprinting, ELISA, Southern•& Northern Blotting and Western Blotting	08	Lectures/Videos / Seminars/ Group discussion/ Assignment	16/11/2023 to 05/12/2023
09.	**Revision**		06/12/2023 to 14/12/2023	

List of labs to be conducted 56 Hrs.	
1. To study the principle and applications of simple, compound and binocular 1 microscopes. 2. To study the principle and applications of various lab equipments- pH 2 meter, Electronic balance, Vortex mixer, use of glass pipette and micropipettes, Laminar air flow, Incubator, shaker, Water bath and centrifuge. 3. To prepare Buffer solutions (Phosphate, Citrate, Tris-HCl buffer) 4. To estimate amount of RNA by Orcinol method. 5. Demonstration of differential centrifugation to fractionate components in a given mixture. 6. To estimate amount of protein by Lowry's method. 7. To identify different unknown amino acids using ascending paper chromatography. 8. Extraction of DNA from the given animal tissue sample. 9. To estimate amount of DNA by di-phenyl amine (DPA) method. 10 Revision	2nd weekof Sep 3rd week of Sep to 1st week of Oct 1nd week of Oct 2nd week of Oct to 3rd week of Oct 4th week of Oct 1st and 2nd week of Nov 3rd week of Nov 4th week ofNov 1st week of Dec 2nd week of Dec

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LESSION PLAN FOR THE ACADEMIC YEAR 2023-24

(Annexure-1.2) Criterion 01 (Metric- 1.1.1)

Paper name: Non-Chordates and Economic Zoology (Theory)

Programme : B.Sc.
Class : V SEM **Total Hours: 60 hours**
Name of the faculty : MN
Duration : September to December

Sl. No	Particulars	No. of Lecture Hours	Methodology /pedagogy	Time period
01.	**Unit-1** **General characters, classification up to classes with suitable examples to all phyla** **1. Protozoa to Coelenterate** • Protozoa-*Paramecium*(Morphology and Reproduction) • Porifera-*Sycon* (Canal System) • Coelenterata – *Obelia* (Morphology and Reproduction) **2. Ctenophora to Nematheiminthes** • Ctenophora –Salient feature • Platyhelminthes - *Taenia* (Tapeworm)(Morphology and Reproduction) • Nemathelminthes - *Ascaris lumbricoides* (Morphology and Reproduction)	15	Lectures/Videos / Seminars/ Group discussion/ Assignment	01/09/2023 to 25/09/2023
02.	**Unit-II** **3. Annelida** • Annelida–*Hirudinaria*(Leech)(Morphology and Reproduction) **4. Arthropoda** • Arthropoda–*Palaemon* (Prawn) Morphology, Appendages, NervousSystemand Reproduction)	15	Lectures/Videos / Seminars/ Group discussion/ Assignment	26/09/2023 to 20/10/2023
03.	**Unit-III** **5.Mollusca to Hemichordata** • Mollusca–*Pila* (Morphology, Shell, Respiration, Nervous System and Reproduction • Echinodermata–*Pentoceros* (Morphology and Water Vascular System) •	15	Lectures/Videos / Seminars/ Group discussion/ Assignment	21/10/2023 to 15/11/2023

04.	**Unit-IV** **6.Economic Zoology: Vectors and Pests** Life cycle and their control of following pests: Gundhi Bug, Sugarcane leafhopper, Rodents, Termites and Mosquitoes and their control 7.**EconomicZoology:** Lac-culture, Vermiculture and Poultry	15	Lectures/Videos / Seminars/Group discussion/ Assignment	16/11/2023 to 05/12/2023
05.	**Revision**		06/12/2023 to 14/12/2023	

List of labs to be conducted 60 Hrs.	
1. Preparation and observation of protozoan culture. 2. **Protozoa**: Systematics of *Amoeba*, *Euglena*, *Noctiluca*, *Paramecium* and *Vorticella* (Permanent slides). 3. **Porifera:**Systematics of *Sycon, Euplectella, Hyalonema, Spongilla* and *Euspongia* (Specimens). Study of permanent slides of T.S of *Sycon*, spicules and gemmules. 4. **Cnidaria:**Systematics of *Aurelia* and *Metridium* (Specimens). Slides of *Hydra*, *Obelia*-polyp and medusa, and *Ephyra* larva, T.S. of*Metridium* passing through mesenteries. *5.* **Stud y of Corals** - *Astraea, Fungia, Meandrina, Corallium, Gorgonia, Millepora* and *Pennatula.* 6. **Helminthes:**Systematics of *Planaria, Fasciola hepatica* and *Taenia solium*, Ascaris-Male and female (Specimens). Slides of T.S.of *Planaria*, T.S of male and female Ascaris. 7.**Annelida:**Systematics of *Nereis, Sabella, Aphrodite* and Leech (Specimens) Slide of T.S. of Earthworm through typhlosole. 8. **Arthropoda**:Systematics of *Panaeus, Palaemon, Astracus,* Scorpion, Spider, *Limulus, Peripatus, Millipede, Centipede*, Prayingmantis, Termite Queen, Moth, Butterfly, Dung beetle / Rhinocerous beetle (Any six specimens). Slide of Larvae-Nauplius, Zoea and Mysis. 9.**Mollusca:**Systematics of *Chiton, Mytilus, Aplysia, Pila, Octopus, Sepia* (Specimens) and Glochidium larva (Slide). 10.**ShellPattern**-*Unio, Ostrea, Cypria, Murex, Nautilus, Patella, Dentalium*, Cuttlebone. (Any four) 11.**Echinodermata**:Systematics of Seastar, Brittlestar, Sea Urchin, Sea cucumber, Sealilly (Specimens). Slides of Bipinnaria larva, Echinopluteus larva and Pedicellaria. 12.**Harmful Non chordates:** Soil Nematodes. Agricultural, veterinary and human pests of Arachnida and Arthropoda. **13.Beneficial Non-chordates:** • **Sericulture:** Lifecycle of *Bombyx mori*, Uzifly, Cocoon, Rawsilk. • **Apiculture**: Any 2 Species of honeybee and bee wax. • **Pearl Culture**: Pearl Oyster and Natural Pearls. **14.VirtualDissection/Cultured specimens:** Earthworm – Nervous system, Leech-Digestive System 15. **Virtual Dissection/Cultured specimens:** Prawn-Nervous system.Cockroach-Salivary Apparatus and Digestive system. 16. Revision	2^{nd}weekof Sep 3^{rd} week of Sep 3^{rd} week of Sep 4^{th} week of Sep 4^{th} week of Sep 1^{st} week of Oct 2^{nd} week of Oct 3^{rd} and 4^{th} week of Oct 1^{st} week of Nov 1^{st} week of Nov 2^{nd} week of Nov 3^{rd} week of Nov 3^{rd} week of Nov 4^{th} week of Nov 1^{st} week of Dec 2^{nd} week of Dec

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LESSION PLAN FOR THE ACADEMIC YEAR 2023-24

(Annexure-1.2) Criterion 01 (Metric- 1.1.1)

Paper name: Chordates and Comparative Anatomy (Theory)

Programme : B.Sc.
Class : V SEM **Total Hours: 60 hours**
Name of the faculty : KMR
Duration : September to December

Sl. No	Particulars	No. of Lecture Hours	Methodology /pedagogy	Time period
01.	**Unit-1** **Chapter1:** Chordates: General characters of each class of chordate withsuitable examples. Origin of Chordates. Basic characters of chordates and classification up to classes. **Chapter2: Hemichordata:** Type Study of *Balanoglossus*–Habit and Habitat, Morphology, Coelom. Tornaria larva and its affinities. Affinities and systematic position of Hemichordata. **Chapter3:Urochordata:** Type Study of *Herdmania*-Habit and Habitat, Morphology, AscidianTadpole-structure and its retrogressive metamorphosis. **Chapter4:Cephalochordata :** Type Study of *Branchiostoma* (*Amphioxus*)-Habit and Habitat, Morphology, Digestive system, Feeding mechanism, excretory andcirculatory system. **Chapter5: Agnatha** General characters of Agnatha and classification up to classes. Salient features of Cyclostomata and Ostracodermi with orders And examples. • Ammocoete larva and its significance.	15	Lectures/Videos / Seminars/ Group discussion/ Assignment	01/09/2023 to 25/09/2023

02.	**Unit-II** **Chapter6:Vertebrates:** General characters and Classification of different classes of vertebrates (Pisces, Amphibia, Reptilia, Aves, Mammalia) upto the order with five characters for each order citing examples. General characters of Chondrichthyes and Osteichthyes. Interesting features and evolutionary significance of Dipnoi. Salient features of Placodermi withexamples. Interesting features of *Sphenodon*, crocodile and *Archaeopteryx.* Salient features of Ratitae and Carinatae with examples. Interesting features of mammalian orders (Insectivora, Carnivora, Chiroptera, Cetacea, Proboscidia, Ungulata–Perissodactyla and Artiodactyla, and Primates–Platyrhini andCatarhini) with examples.	15	Lectures/Videos / Seminars/ Group discussion/ Assignment	26/09/2023 to 20/10/2023
03.	**Unit-III** **Chapter7.GeneralaccountofChordates:** Types of caudal fins, scales and swim bladder in fishes.Origin of Amphibia. Neoteny and Paedogenesis. Adaptive radiation in extinct reptiles withsuitable examples. Temporal fossae in reptiles. Poison apparatus and biting mechanism in snakes. Parental care in Pisces and Amphibians. Flight adaptations in birds. • Dentition in mammals. Evolution of molar tooth. Migration in Pisces, Birds and Mammals.	15	Lectures/Videos / Seminars/ Group discussion/ Assignment	21/10/2023 to 15/11/2023
04.	**Unit-IV** **Comparative Anatomy of Vertebrates:** **Chapter8. Integumentary System:** Structure of skin and its derivatives. **Chapter 9. Skeletal System** • Comparative account of Axial Skeletal system in vertebrates; Skull- Amphibian (Frog), Reptiles (Lizard), Aves (Pigeon) and Mammals (Man). • Comparative account of Appendicular skeletal system in vertebrates- Pectoral and Pelvic girdles of Amphibian (Frog), Reptiles (Lizard),Aves (Pigeon) and Mammals (Man). **Chapter-7 Respiratory system** • Comparative account of respiratory system in	15	Lectures/Videos / Seminars/Group discussion/ Assignment	16/11/2023 to 05/12/2023

	vertebrates: Pisces (Scolidon), Amphibian (Frog), Reptiles (Lizard), Aves (Pigeon) and Mammals (Man). **Chapter-8 CirculatorySystem** • Comparative account of heart and aortic arches in vertebrates: Pisces (Scoliodon), Amphibian (Frog), Reptiles (Lizard), Aves (Pigeon) and Mammals (Man). **Chapter-9 Excretory System** • Succession of kidney in vertebrates. **Chapter-9 Nervous system** Comparative account of brain in vertebrates: Pisces (Scoliodon), Amphibian (Frog), Reptiles (Lizard), Aves (Pigeon) and Mammals (Man).			
05.	**Revision**		06/12/2023 to 14/12/2023	

List of labs to be conducted 60 Hrs.	
1. **Protochordata**: Balanoglossus and its T. S. through proboscis Ascidian/*Herdmania* and *Amphioxus*, T.S. of *Amphioxus* through pharynx and intestine.	2nd weekof Sep 3rd week of Sep
2. **Cyclostomata: -***Petromyzon*, Ammocoete larva and *Myxine.*	3rd week of Sep
3. **Pisces**:	
4. Cartilaginous Fishes – *Narcine, Trygon, Pristis, Myolobaties*	
5. Bony Fishes–Zebrafish, Hippocampus, Muraena, Ostracion, Tetradon, Pleuronectus,	4th week of Sep
6. Ornamental fishes: -Siamese, Koi, Oscar, Betta Sp., Neon tetra, Guppies, Goldfish, Angle fish, Rainbow fish, Mollies (Locally available any five aquarium fishes).	4th week of Sep 1st week of Oct
7. **Accessory respiratory organs**– *Sacco branchus, Clarias* and *Anabas.Diodon. Echineis (Any four)*	
8. **Amphibia**: - *Rana, Bufo, Ambystoma, Axolotllarva, Necturus and Ichthyophis.*	2nd week of Oct 3rd and 4th week of Oct
10. **Reptilia**: -Turtle, Tortoise, *Mabuya, Calotes*, Chameleon, *Varanus*. snakes–Dryophis, Rat snake, Brahmini, Cobra, Krait, Russell's viper and Hydrophis;	
11. **Aves:** Beak and feet modifications in the following examples:Duck, Crow, Sparrow, Parrot,Kingfisher, Eagle or Hawk. (Any four)	1st week of Nov 1st week of Nov
12. **Mammalia**: Mongoose, Squirrel, Pangolin, Hedge Hog, Rat and Loris. (Any four)	2nd week of Nov
13. Virtual Dissection/Cultured specimens: Shark/Bony fish: Afferent and efferent branchial systems, glosso-pharyngeal and vagusnerves.	3rd week of Nov 4th week of Nov
14. Virtual Dissection/Cultured specimens: Rat: Dissection (only demonstration)– Circulatory system (arterial and venous),Urinogenital system.	1st week of Dec
14- 16. **Skeletal System in Shark/ Frog/ Pigeon/ Rabbit:** Skull, vertebrae, girdles andlimb bones (Except hands and feet) 16. Revision	2nd week of Dec