**NOTICE**

Date: 06-July-2021

It is here by informed to all the students that commencement of second, fourth and sixth semester class will be on 6th July 2021. The teachers have assigned paper as per following. Each assign teachers will take internal examination. Inter will taken on practical as well as on theory. The class will be follow following routine. Students are requested to cooperate with faculties and beware about internal examinations.

HOD
Department of Zoology
Rabindra Mahavidyalaya

## Theory Paper Allotment

| Semestar | Batch | Paper | Subject | Abbreviated Name | Allotted Teacher | Contact Number |
|---|---|---|---|---|---|---|
| Sem I | HONS | CC-1 | **Non-Chordates I** | E.M | Eureka Mondal | 8250656417, 9476440223 |
| | | | | P.P | Piyali Pakhira | 8961185116, 7718534071 |
| | | | | S.N.D | Sudha Anjella Dhan | 8874744784, 8910634099 |
| | | CC-2 | **Ecology** | P.K.M | Palas Kanti Manna | 9732381772, 9382113782 |
| | | | | B.S | Dr. Baisakhi Saha | 9433315086, 7003580734 |
| | | | | S.R.D | Souren Dutta | 7031282464, 9475671886 |
| | GEN | GE/CC-1 | **Animal Diversity** | S.R.D | Souren Dutta | 7031282464, 9475671886 |
| | | | | E.M | Eureka Mondal | 8250656417, 9476440223 |
| SEM III | HONS | CC-5 | **Chordates** | B.S | Dr. Baisakhi Saha | 9433315086, 7003580734 |
| | | | | P.P | Piyali Pakhira | 8961185116, 7718534071 |
| | | CC-6 | **Animal Physiology: Controlling &Coordinating Systems** | E.M | Eureka Mondal | 8250656417, 9476440223 |
| | | | | S.N.D | Sudha Anjella Dhan | 8874744784, 8910634099 |
| | | CC-7 | **Fundamentals of Biochemistry** | S.R.D | Souren Dutta | 7031282464, 9475671886 |
| | | | | P.K.M | Palas Kanti Manna | 9732381772, 9382113782 |
| | | SEC-1 | **Apiculture or Sericulture** | E.M | Eureka Mondal | 8250656417, 9476440223 |
| | | | | P.K.M | Palas Kanti Manna | 9732381772, 9382113782 |
| | | | | S.N.D | Sudha Anjella Dhan | 8874744784, 8910634099 |
| | GEN | GE/CC-3 | **Physiology and Biochemistry** | S.R.D | Souren Dutta | 7031282464, 9475671886 |
| | | | | E.M | Eureka Mondal | 8250656417, 9476440223 |
| Sem V | HONS | CC-11 | **Molecular Biology** | S.R.D | Souren Dutta | 7031282464, 9475671886 |
| | | | | P.K.M | Palas Kanti Manna | 9732381772, 9382113782 |
| | | CC-12 | **Genetics** | P.P | Piyali Pakhira | 8961185116, 7718534071 |
| | | | | S.N.D | Sudha Anjella Dhan | 8874744784, 8910634099 |
| | | DSC-1 & 2 | **Animal Biotechnology or Microbiology** | P.K.M | Palas Kanti Manna | 9732381772, 9382113782 |
| | | | | B.S | Dr. Baisakhi Saha | 9433315086, 7003580734 |
| | | DSC-3 & 4 | **Biology of Insects** or **Parasitology** | P.P | Piyali Pakhira | 8961185116, 7718534071 |
| | | | | E.M | Eureka Mondal | 8250656417, 9476440223 |
| | GEN | DSC-1 | **Aquatic Biology or Applied Zoology** | S.R.D | Souren Dutta | 7031282464, 9475671886 |
| | | | | E.M | Eureka Mondal | 8250656417, 9476440223 |
| | | SEC-3 | **Sericulture** | P.P | Piyali Pakhira | 8961185116, 7718534071 |
| | | | | S.N.D | Sudha Anjella Dhan | 8874744784, 8910634099 |

## Practical Paper Allotment

| Semestar | Batch | Paper | Subject | Allotted Teacher |
|---|---|---|---|---|
| **Sem I** | HONS | CC-1 | **Non-Chordates I** | SND |
| | | CC-2 | **Ecology** | PKM |
| | GEN | GE/CC-1 | **Animal Diversity** | SND |
| **SEM III** | HONS | CC-5 | **Chordates** | PP |
| | | CC-6 | **Animal Physiology: Controlling & Coordinating Systems** | SND |
| | | CC-7 | **Fundamentals of Biochemistry** | PKM |
| | GEN | GE/CC-3 | **Physiology and Biochemistry** | EM |
| **Sem V** | HONS | CC-11 | **Molecular Biology** | PKM |
| | | CC-12 | **Genetics** | SAD |
| | | DSC-1 | **Animal Biotechnology or Microbiology** | BS |
| | | DSC-2 | **Aquatic Biology or Applied Zoology** | EM |
| | GEN | DSC-3 | **Aquatic Biology or Applied Zoology** | PP |

## Sem – I

## CC-1 (Theory)

| Sem | Paper | Subject Topic | Asign Teacher |
|---|---|---|---|
| **I (Hons)** | CC1 **Non-Chordates I** | **Basics of Animal** Classification Definitions: Classification, Systematics and Taxonomy; Taxonomic Hierarchy, Taxonomic types. Codes of Zoological Nomenclature; Principle of priority; Synonymy and Homonymy; Five kingdom concept of classification (Whittaker) | SND |
| | | **Protista and Metazoa** Protozoa General characteristics and Classification up to phylum (according to Levine *et. al.,* 1980) Locomotion in *Euglena, Paramoecium and Amoeba*; Conjugation in *Paramoecium*. Life cycle and pathogenicity of *Plasmodium vivax and Entamoeba histolytica* Metazoa Evolution of symmetry and segmentation of Metazoa | EM |
| | | **Porifera** General characteristics and Classification up to orders (after Hyman, 1951); Canal system and spicules in sponges | EM |
| | | **Cnidaria** General characteristics and Classification up to orders. Metagenesis in *Obelia* Polymorphism in Cnidaria Corals and coral reef diversity, function & conservation | SND |
| | | **Ctenophora** General characteristics | PP |
| | | **Platyhelminthes** General characteristics and Classification up to classes Life cycle and pathogenicity and control measures of *Fasciola hepatica* and *Taenia solium* | PP |
| | | **Nematoda** General characteristics and Classification up to classes Life cycle, and pathogenicity and control measures of *Ascaris lumbricoides and Wuchereria bancrofti* | PP |

## CC-2 (Theory)

| Sem | Paper | Subject Topic | Asign Teacher |
|---|---|---|---|
| **I (Hons)** | CC-2 **Ecology** | **Introduction to Ecology** History of ecology, Autecology and synecology, Levels of organization, Laws of limiting factors, Study of Physical factors, The Biosphere. | PKM |
| | | **Population** Unitary and Modular populations Unique and group attributes of population: Demographic factors, life tables, fecundity tables, survivorship curves, dispersal and dispersion. Geometric, exponential and logistic growth, equation and patterns, and K strategies. Population regulation, density dependent and independent factors Population Interactions, Gause's Principle with laboratory and field examples, Lotka-Volterra equation for competition | S.R.D |
| | | **Community** Community characteristics: species diversity, abundance, , dominance, richness, Vertical stratification, Ecotone and edge effect. succession with one example | S.R.D |
| | | **Ecosystem** Types of ecosystem with an example in detail, Food chain: Detritus and grazing food chains, Linear and Y-shaped food chains, Food web, Energy flow through the ecosystem, Ecological pyramids and Ecological efficiencies Nutrient and biogeochemical cycle with an example of Nitrogen cycle Human modified ecosystem | PKM |
| | | **Applied Ecology** Wildlife Conservation (in-situ and ex-situ conservation). Management strategies for tiger conservation; Wild life protection act (1972) | BS |

## GE/CC-1 (Theory)

| Sem | Paper | Subject Topic | Asign Teacher |
|---|---|---|---|
| **I General** | CC-1 **ANIMAL DIVERSITY** | **Kingdom Protista**<br>General characters and classification of Subkingdom Protozoa up to Phylum (Levine *et al.*, 1980); Locomotory Organelles and locomotion in Protozoa | EM |
| | | **Phylum Porifera**<br>General characters and classification up to classes; Canal System in *Sycon* | EM |
| | | **Phylum Cnidaria**<br>General characters and classification up to classes; Polymorphism in Hydrozoa. | EM |
| | | **Phylum Platyhelminthes**<br>General characters and classification up to classes; Life history of *Taenia solium* | EM |
| | | **Phylum Nematoda**<br>General characters and classification up to classes; Life history of *Ascaris lumbricoides* and its parasitic adaptations | EM |
| | | **Phylum Annelida**<br>General characters and classification up to classes; Nephridia in Annelida | EM |
| | | **Phylum Arthropoda**<br>General characters and classification up to classes; Vision in insect, Metamorphosis in Insects | EM |
| | | **Phylum Mollusca**<br>General characters and classification up to classes; Respiration in *Pila* | EM |
| | | **Phylum Echinodermata**<br>General characters and classification up to classes; Water-vascular system in Asterias | EM |
| | | **Protochordates**<br>General features; Feeding in *Branchiostoma* | EM |
| | | **Agnatha**<br>General features and classification up to classes (Young, 1981) | SRD |
| | | **Pisces**<br>General features and Classification up to Subclasses (Romer, 1959); Osmoregulation in Fishes | SRD |
| | | **Amphibia**<br>General features and Classification up to living orders (Duellman & Trueb, 1986); Metamorphosis in Toad | SRD |
| | | **Reptiles**<br>General features and Classification up to living Subclass (Young, 1981); Poisonous and non-poisonous snakes, Biting mechanism in snakes | SRD |
| | | **Aves**<br>General features and Classification up to orders (Young, 1981); Flight adaptations in birds | SRD |
| | | **Mammals**<br>Classification up to Subclasses (Young, 1981); Origin & distribution of Cranial nerves in *Cavia* | SRD |

| Sem | Paper | Subject Topic | Asign Teacher |
|---|---|---|---|
| I (Hons) | CC1 **Non-Chordates I** Chordates-I | Preparation of stained whole mount of *Euglena, Amoeba and Paramoecium* | SND |
| | | Spot Identification of *Amoeba, Euglena, Entamoeba, Opalina, Paramecium, Plasmodium vivax and Plasmodium falciparum* (from the prepared slides) | |
| | | Spot Identification of *Sycon, Neptune's Cup, Obelia, Physalia, Millepora ,Aurelia,* | |
| | | Spot Identification of *Tubipora,Corallium,Alcyonium,Gorgonia,Metridium,Pennatula,Fungia,Meandrina,Madrepora* | |
| | | Spot Identification and significance of adult Fasciola hepatica, Taenia solium and Ascaris lumbricoides. | |
| | | Staining/mounting of any protozoa/helminth from gut of cockroach | |

| Sem | Paper | Subject Topic | Asign Teacher |
|---|---|---|---|
| I (Hons) | CC-2 **Ecology** | Study of life tables and plotting of survivorship curves of different types from the hypothetical/real data provided | PKM |
| | | Determination of population density in a natural/hypothetical community by quadrate method and calculation of Shannon-Weiner diversity index for the same community | |
| | | Study of an aquatic ecosystem: Phytoplankton and zooplankton, Measurement of area, temperature, determination of pH and free $CO_2$ | |
| | | Report on a visit to National Park/Biodiversity Park/Wild life sanctuary/ Biodiversity Centre/ Any Museum/Sea shore | |

| Sem | Paper | Subject Topic | Asign Teacher |
|---|---|---|---|
| I GEN | CC-1 **ANIMAL DIVERSITY** | Spot identification of the following specimens: *Amoeba, Euglena, Plasmodium, Paramecium, Sycon, Euspongia,, Obelia, Physalia, Aurelia, Tubipora, Metridium, Taenia solium,* Male and female *Ascaris lumbricoides, Aphrodite, Nereis, Pheretima, Hirudinaria, Palaemon, Cancer, Limulus, Palamnaeus, Scolopendra, Julus, Periplaneta, Apis, Chiton, Dentalium, Pila, Unio, Loligo, Sepia, Octopus, Pentaceros, Ophiura, Echinus, Cucumaria* and *Antedon, Balanoglossus, Herdmania, Branchiostoma, Petromyzon, Sphyrna, Pristis, Torpedo, Labeo, Exocoetus, Anguilla, Ichthyophis/Ureotyphlus, Salamandra, Bufo, Hyla, Chelone, Hemidactylus, Chamaeleon, Draco, Vipera, Naja, Crocodylus, Gavialis, Passer, Psittacula, Alcedo, Sorex, Pteropus, Funambulus, Suncus* | SND |
| | | Study of the following permanent slides: Transverse section of male and female *Ascaris* | |
| | | Identification of poisonous and non-poisonous snakes | |
| | | An "animal album" containing photographs, cut outs, with appropriate write up about the above mentioned taxa. Different taxa/ topics may be given to different sets of students for this purpose. | |

## Sem -III

## CC-5 (Theory)

| Sem | Paper | Subject Topic | Asign Teacher |
|---|---|---|---|
| III HONS | **Chordates** CC-5 | **Introduction to Chordates**<br>General characteristics and outline classification of Phylum Chordata | PP |
| | | **Protochordata**<br>1. General characteristics and classification of sub-phylum Urochordata and Cephalochordate up to Classes.<br>2. Retrogressive metamorphosis in Ascidia.<br>3. Chordate Features and Feeding in Branchiostoma | PP |
| | | **Origin of Chordata**<br>1. Dipleurula concept and the Echinoderm theory of origin of chordates<br>2. Advanced features of vertebrates over Protochordata | PP |
| | | **Agnatha**<br>General characteristics and classification of cyclostomes up to order | PP |
| | | **Pisces**<br>1. General characteristics and classification of Chondrichthyes and Osteichthyes up to Subclasses<br>2. Accessory respiratory organ, migration and parental caring fishes<br>3. Swim bladder in fish | PP |
| | | **Amphibia**<br>1. General characteristics and classification unto living Orders.<br>2. Metamorphosis and parental care in Amphibia | BS |
| | | **Reptilia**<br>1. General characteristics and classification up to living Orders.<br>2. Poison apparatus and Biting mechanism in Snake | BS |
| | | **Aves**<br>1. General characteristics and classification up to Sub-Classes<br>2. Exoskeleton and migration in Birds<br>3. Principles and aerodynamics off flight | BS |
| | | **Mammals**<br>1. General characters and classification up to living orders<br>2. Affinities of Prototheria<br>3. Exoskeleton derivatives of mammals<br>4. Adaptive radiation in mammals with reference to locomotory appendages<br>5. Echolocation in Micro-chiropterans and Cetaceans | BS |
| | | **Zoogeography**<br>Zoogeographical realms, Plate tectonic and Continental drift theory, distribution of birds and mammals in different realms | BS |

## CC-6 (Theory)

| SEM | Paper | Subject | Assigned Teacher |
|---|---|---|---|
| III HONS | **Animal Physiology: Controlling & Coordinating Systems** CC-6 | **Tissues**<br>Structure, location, classification and functions of epithelial tissue, connective tissue, muscular tissue and nervous tissue | SND |
| | | **Bone and Cartilage**<br>Structure and types of bones and cartilages, Ossification | SND |
| | | **Nervous System**<br>1. Structure of neuron, resting membrane potential, Origin of action potential and its propagation across the myelinated and unmyelinated nerve fibers.<br>2. Types of synapse, Synaptic transmission and Neuro-muscular junction;<br>3. Reflex action and its types | SND |
| | | **Muscular System**<br>1. Histology of different types of muscle;<br>2. Ultra-structure of skeletal muscle;<br>3. Molecular and chemical basis of muscle contraction; Characteristics of muscle fibre | SND |
| | | **Reproductive System**<br>1. Histology of testis and ovary<br>2. Physiology of Reproduction (Estrus and Menstrual cycle) | EM |
| | | **Endocrine System**<br>1. Histology and function of pituitary, thyroid, pancreas and adrenal<br>2. Classification of hormones;<br>3. Mechanism of Hormone action: Signal transduction pathways for Steroidal and Nonsteroidal hormones<br>4. Hypothalamus (neuroendocrine gland) – principal nuclei involved in neuroendocrine control of anterior pituitary and endocrine system<br>5. Placental hormones | EM |

## CC-7 (Theory)

| Sem | Topic | Subject | Teacher |
|---|---|---|---|
| III HONS | **Fundamentals of Biochemistry** CC-7 | **Carbohydrates**<br>1. Structure and Biological importance: Monosaccharides, Disaccharides, Polysaccharides; Derivatives of Monosachharides<br>2. Carbohydrate metabolism: Glycolysis, Citric acid cycle, Pentose phosphate pathway, Gluconeogenesis | SRD |
| | | **Lipids**<br>1. Structure and Significance: Physiologically important saturated and unsaturated fatty acids, Tri- acyl glycerols, Phospholipids, Sphingolipid, Glycolipids, Steroids, Eicosanoids and terpinoids.<br>2. Lipid metabolism: β-oxidation of fatty acids; Fatty acid biosynthesis | PKM |
| | | **Proteins**<br>1. Amino acids : Structure, Classification, General and Electrochemical properties of α-amino acids; Physiological importance of essential and non-essential amino acids<br>2. Proteins: Bonds stabilizing protein structure; Levels of organization<br>3. Protein metabolism: Transamination, Deamination, Urea cycle, Fate of C-skeleton of Glucogenic and Ketogenic amino acids | PKM |
| | | **Nucleic Acids**<br>1. Structure: Purines and pyrimidines, Nucleosides, Nucleotides, Nucleic acids<br>2. Types of DNA and RNA, Complementarity of DNA, Hypo-Hyper chromaticity of DNA<br>3. Basic concept of nucleotide metabolism | SRD |
| | | :**Enzymes**<br>1. Nomenclature and classification; Cofactors; Specificity of enzyme action; Isozymes<br>2. Mechanism of enzyme action; Enzyme kinetics; Derivation of Michaelis-Menten Equation, Lineweaver-Burk plot; Factors affecting rate of enzyme- catalyzed reactions; Enzyme inhibition; Allosteric enzymes and their Factors affecting rate of enzyme-catalyzed reactions;<br>3. Enzyme inhibition; Allosteric enzymes and their kinetics; Strategy of enzyme action4. Catalytic and Regulatory (Basic concept with one example each) | SRD |
| | | **Oxidative Phosphorylation**<br>Redox systems; Review of mitochondrial respiratory chain, Inhibitors and un-couplers of Electron. | SRD |

## SEC-1

**SEC-Apiculture/ Sericulture**

| Sem | Topic | Subject | Teacher |
|---|---|---|---|
| III HONS | **SEC T1 – Apiculture** | **Biology of Bees**<br>1. History, Classification and Biology of Honey Bees<br>2. Social Organization of Bee Colony | SND |
| | | **Rearing of Bees**<br>1. Artificial Beer earing (Apiary),Beehives–Newton and Langstroth.<br>2. Bee Pasturage.<br>3. Selection of Bee Species for Apiculture.<br>4. Bee Keeping Equipment.<br>5. Methods of Extraction of Honey (Indigenous and Modern). | EM |
| | | **Diseases and Enemies**<br>Bee Diseases and Enemies, Control and Preventive measures | PKM |
| | | **Bee Economy**<br>Products of Apiculture Industry and its Uses(Honey, Bees Wax, Propolis), Pollenetc | PKM |
| | | **Entrepreneurshipin Apiculture**<br>Bee Keeping Industry–Recent Efforts, Modern Methods in employing artificial Beehives for cross pollination in horticultural gardens | SND |

| Sem | Topic | Subject | Teacher |
|---|---|---|---|
| III HONS | **SEC T1–Sericulture** | **Introduction**<br>1. Sericulture: Definition, history and present status; Silk route<br>2. Types of silkworms, Distribution and Races , Exotic and indigenous races Mulberry and nonmulberry Sericulture | S.N.D |
| | | **Biology of Silkworm**<br>1. Life cycle of Bombyx mori<br>2. Structure of silk gland and secretion of silk | S.N.D |
| | | **Rearing of Silk worms**<br>1. Selection of mulberry variety and establishment of mulberry garden<br>2. Rearing house and rearing appliances. Disinfectants: Formalin, bleaching powder, RKO<br>3. Silkworm rearing technology: Early age and Late age rearing<br>4. Types of mount ages<br>5. Spinning, harvesting and storage of cocoons. | E.M |
| | | **Pests and Diseases**<br>1. Pests of silkworm :Uzifly, dermestid beetles and vertebrates<br>2. Pathogenesis of silkworm diseases: Protozoan, viral, fungal and bacterial<br>3. Control and prevention of pests and diseases | P.K.M |
| | | **Entrepreneurshipin Sericulture**<br>1. Prospectus of Sericulture in India: Sericulture industry in different states, employment, potential in mulberry and non-mulberry sericulture<br>2. Visit to various sericulture centers. | P.K.M |

## GE/CC-3 (General)

| SEM | Topic | Subject | Teacher |
|---|---|---|---|
| III<br>General | **PHYSIOLOGY AND BIOCHEMISTRY** | **Nerve and muscle**<br>1. Structure of a neuron, Resting membrane potential, Graded potential, Origin of Action potential and its propagation in myelinated and non-myelinated nerve fibres.<br>2. Ultra-structure of skeletal muscle, Molecular and chemical basis of muscle contraction. | EM |
| | | **Digestion**<br>Physiology of digestion in the alimentary canal; Absorption of carbohydrates, proteins, lipids | EM |
| | | **Respiration**<br>Pulmonary ventilation, Respiratory volumes and capacities, Transport of Oxygen and carbon dioxide in blood | EM |
| | | **Excretion**<br>Structure of nephron, Mechanism of Urine formation, Counter-current Mechanism | EM |
| | | **Cardiovascular system**<br>Composition of blood, Homeostasis, Structure of Heart, Origin and conduction of the cardiac impulse, Cardiac cycle. | EM |
| | | **Reproduction and Endocrine Glands**<br>Physiology of male reproduction: hormonal control of spermatogenesis; Physiology of female reproduction: hormonal control of menstrual cycle.<br>Structure and function of pituitary, thyroid, pancreas and adrenal | EM |
| | | **Carbohydrate: Structure and Metabolism**<br>Introduction to Carbohydrates, Structure & Types of Carbohydrates, Isomerism, Introduction to Intermediary metabolism: Glycolysis, Krebs<br>cycle, Pentose phosphate pathway, Gluconeogenesis, Electron transport chain | SRD |
| | | **Lipid: Structure and Metabolism**<br>Introduction to Lipids: Definitions; fats and oils; classes of lipids;<br>Lipoproteins; Biosynthesis and β oxidation of palmitic acid | EM |
| | | **Protein: Structure and metabolism**<br>Proteins and their biological functions, functions of amino acids, physicochemical properties of amino acids. Peptides – structure and properties; primary structure of protein, secondary, tertiary and quaternary structures. Transamination, Deamination and Urea Cycle. | SRD |
| | | **Enzymes**<br>Introduction, Classification of Enzymes, Mechanism of action, Enzyme Kinetics, Inhibition and Regulation | SRD |

## CC-5 [Practical]

| Sem | Topic | Subject | Teacher |
|---|---|---|---|
| III HONS | **Chordates** CC-5 | Spot identification of<br>a. Protochordata : Balanoglossus, Herdmania, Branchiostoma<br>b. Agnatha: Petromyzon, Myxine<br>c. Fishes: Scoliodon,Sphyrna,Pristis, Torpedo, Chimaera, Mystus, Heteropneustes, Labeo, Catla, Cirrhinus, Hypopthalmichthys, Cyprinus, Ctenopharyngodon,Exocoetus, Echeneis, Anguilla, Hippocampus,Tetrodon/Diodon, Anabas, Clarias<br>d. Amphibia: Necturus, Bufo, Hyla, Alytes, Axolotl larva, Tylototriton<br>e. Reptilia: Chelone, Trionyx, Hemidactylus, Varanus, Uromastix, Mabuya, Draco, Bungarus, Vipera, Naja, Hydrophis<br>f. Mammalia: Bat (Insectivorous and Frugivorous), Funambulus | PP |
| | | Key for Identification of poisonous and non-poisonous snake | |
| | | Mounting of Pecten from Fowl head | |
| | | . Dissection of brain and pituitary of any major carp | |
| | | Power point presentation on study of any two animals from two different classes by students (may be included if dissections not permitted | |

## CC-6 [Practical]

| Sem | Topic | Subject | Teacher |
|---|---|---|---|
| III HONS | **Animal Physiology: Controlling &Coordinating Systems** CC-6 | Recording of simple muscle twitch with electrical stimulation(or Virtual) | SND |
| | | Demonstration of the unconditioned reflex action(Deep tendon reflex suchas knee jerk reflex) | |
| | | Preparation of temporary mounts: Squamous epithelium, Striated muscle fibres | |
| | | Identification of permanent slides of Mammalian Cartilage, Bone, Pituitary, Liver, Kidney, Intestine, Lung, Pancreas, Testis, Ovary, Adrenal, Thyroid | |
| | | Microtomy: Preparation of permanent slide of any five mammalian(Goat/white rat)tissues | |

## CC-7 [Practical]

| Sem | Topic | Subject | Teacher |
|---|---|---|---|
| III HONS | **Fundamentals of Biochemistry** CC-7 | Qualitative tests of functional groups in carbohydrates (Benedict's test), proteins (Biuret's test) and lipids (Saponification number). | PKM |
| | | Paper chromatography of amino acids | |
| | | . Quantitative estimation of protein by Lowry Method | |
| | | Demonstration of protein separation by SDS-PAGE | |
| | | To study the enzymatic activity of Salivary amylase and Catalase in *Cajanus cajan*. | |

## GE/CC-3 [Practical]

| Sem | Topic | Subject | Teacher |
|---|---|---|---|
| III GEN | **PHYSIOLOGY AND BIOCHEMISTRY** PRACTICAL GE/CC-3 | Preparation of hemin crystals | EM |
| | | Identification of permanent histological sections of mammalian pituitary, thyroid, pancreas, adrenal gland, small intestine, liver, lung, kidney | |
| | | Qualitative tests to identify functional groups of carbohydrates in given solutions: Glucose (Benedict's test),Sucrose (Iodine test) | |
| | | Quantitative estimation of total protein in given solutions by Lowry's method. | |
| | | . Study of activity of salivary amylase under optimum conditions | |

## SEM –V

## CC-11

| Sem | Topic | Subject | Teacher |
|---|---|---|---|
| **V HONS** | **Molecular Biology** CC-11 | **Nucleic Acids**<br>1. Salient features of DNA and RNA<br>2. Watson and Crick Model of DNA | SRD |
| | | **DNA Replication**<br>1. Mechanism of DNA Replication in Prokaryotes, Semi-conservative, bidirectional and discontinuous Replication, RNA priming,<br>2. Replication of telomeres | SRD |
| | | **Transcription**<br>Mechanism of Transcription in prokaryotes and eukaryotes, Transcription factors, Difference between prokaryotic and eukaryotic transcription. | SRD |
| | | **Translation**<br>1. Mechanism of protein synthesis in prokaryotes,<br>2. Ribosome structure and assembly in prokaryotes, fidelity of protein synthesis, aminoacyl tRNA synthetases and charging of tRNA;<br>Proteins involved in initiation, elongation and termination of polypeptide chain;<br>3. Genetic code, Degeneracy of the genetic code and Wobble Hypothesis;<br>4. Inhibitors of protein synthesis;<br>5. Difference between prokaryotic and eukaryotic translation | SRD |
| | | **Post Transcriptional Modificationsand Processing of Eukaryotic RNA**<br>1. Capping and Poly A tail formation in mRNA;<br>2. Split genes: concept of introns and exons, splicing mechanism, alternative splicing,<br>Exon shuffling, and RNA editing,<br>3. Processing of tRNA | PKM |
| | | **Gene Regulation**<br>1. Regulation of Transcription in prokaryotes: lac operon and trp operon;<br>2. Regulation of Transcription in eukaryotes: Activators, enhancers, silencer, repressors,<br>3. miRNA mediated gene silencing,<br>4. Genetic imprinting | PKM |
| | | **DNA Repair Mechanisms**<br>Types of DNA repair mechanisms, RecBCD model in prokaryotes, nucleotide and base excision repair,<br>SOS repair | PKM |
| | | **Principles of Molecular Techniques**<br>1. PCR<br>2. Western and Southern blot<br>3. Northern Blot<br>4. Sanger DNA sequencing | PKM |

## CC-12

| Sem | Topic | Subject | Teacher |
|---|---|---|---|
| **V HONS** | **Genetics** CC-12 | **Mendelian Genetics and its Extension**<br>1. Principles of inheritance, Incomplete dominance and co-dominance, Epistasis Multiple alleles, Lethal alleles, Pleiotropy<br>2. Sex-linked, sex-influenced and sex-limited inheritance,<br>3. Polygenic Inheritance. | PP |
| | | **Linkage, Crossing Over and Chromosomal Mapping**<br>1. Linkage and Crossing Over, molecular basis of crossing over,<br>2. Measuring Recombination frequency and linkage intensity using three factor crosses, Interference and coincidence | PP |
| | | **Mutations**<br>1. Types of gene mutations(Classification),<br>2. Types of chromosomal aberrations(Classification with one suitable example of each),<br>3. Non-disjunction and variation in chromosome number;<br>4. Molecular basis of mutations in relation to UV light and chemical mutagens. | PP |
| | | **Sex Determination**<br>1. Mechanisms of sex determination in Drosophila<br>2. Sex determination in mammals<br>3. Dosage compensation in Drosophila & Human | SND |
| | | **Extra-chromosomal Inheritance**<br>1. Criteria for extra chromosomal inheritance, Antibiotic resistance in Chlamyadomonas,<br>2. Kappa particle in Paramoecium<br>3. Shell spiralling in snail | SND |
| | | **Recombination in Bacteria and Viruses**<br>1. Conjugation, Transformation, Transduction,<br>2. Complementation test in Bacteriophage | SND |
| | | **Transposable Genetic Elements**<br>1. Transposons in bacteria, Ac-Ds elements in maize and P elements in Drosophila,<br>2. LINE, SINE, Alu elements in humans | SND |

## DSE – 1 & 2

| SEM | Paper | Subject | Teacher |
|---|---|---|---|
| **V HONS** | **Animal Biotechnology** DSE T1 | **Introduction** 1. Organization of prokaryotic and eukaryotic genome, 2. Concept of genomics | BS |
| | | **Molecular Techniques in Gene Manipulation** 1. Cloning vectors: Plasmids, Cosmids, Phagemids, Lambda Bacteriophage, M13, BAC, YAC, MAC and Expression vectors (characteristics). 2. Restriction enzymes: Nomenclature, detailed study of Type II. 3. Transformation techniques: Calcium chloride method and electroporation. 4. Construction of genomic and cDNA libraries and screening by colony and plaque hybridization 5. Southern, Northern and Western blotting 6. DNA sequencing: Sanger method 7. Polymerase Chain Reaction, DNA Fingerprinting and DNA microarray | BS |
| | | **Genetically Modified Organisms** 1. Production of cloned and transgenic animals: Nuclear Transplantation, Retroviral Method, DNA microinjection. 2. Applications of transgenic animals: Production of pharmaceuticals, production of donor organs, knockout mice. | PKM |
| | | **CultureTechniquesand Applications** 1. Animal cell culture, 2. Expressing cloned genes in mammalian cells, 3. Molecular diagnosis of genetic diseases (Cystic fibrosis, Sickle cell anaemia) | PKM |

| SEM | Paper | Subject | Teacher |
|---|---|---|---|
| **V HONS** | **Microbiology** DSE T2 | **Introduction to Microbiology** Historical perspective of Microbiology, Prokaryotic pathogens, Eukaryotic pathogens | PKM |
| | | **Bacterial Taxonomy** Principles and modern approaches of bacterial taxonomy. Basic idea about Hackel and Whittaker's kingdom concept and domain concept of Carl Woose | PKM |
| | | **Morphology of Bacteria and Virus** Cell wall (Structure of peptidoglycan), Cell envelope (Cell membrane, Differences between gram- positive and gram-negative species, External capsule and glycocalyx, Plasmids and episomes. Nuclear material, Bacterial Chromosome (Fundamental differences with eukaryotic chromosome). Reserve materials (carbon and phosphate reserve, cyanophycin), Cytoplasmic inclusions (Chlorosome, magnetosome, carboxysome, gasvesicles, ribosome). Structural organization of viruses, Prions and viroids | PKM |
| | | **Normal flora** Distribution of normal flora in the body: Skin, eye, mouth, intestinal tract, urino-genital tract, Beneficial functions of normal flora. Harmful effects of normal flora | BS |
| | | **Pathogenicity of Microorganisms** Bacterial pathogenesis: Entry to the host, Adherence to host cells, Invasiveness, Bacterial toxins: Exotoxins, Endotoxins, Antigenic switching. Viral Pathogenesis: Cellular level(Cell death, Transformation, Cell fusion, Cytopathic effect).Initial infections: Routes of entry and dissemination to secondary sites, Typical secondary sites of localization, Virus shedding and mode of transmission; Factors involved intermination of acute infection | BS |
| | | **Infection of pathogens to human populations** Communicable, Non-communicable, Endemic, Epidemic, Pandemic and Sporadic | BS |
| | | **Diagnostic Microbiology and Bacteria culture** Koch's postulates, Sensitivity and specificity of test results, Principles and applications: Simple staining, Gram-staining, Acid-fast staining, Collection of specimens, Growth requirements and Growth factors, Oxygen requirement. Culture Media: Simple media, Complex media, Selective media and Enriched media | PKM |
| | | **Genetic recombination in bacteria** Transformation, Conjugation-F+, F-, Hfr & F' strain, Transduction, Generalized & specialized types | BS |

## DSE – 3 & 4

| SEM | Paper | Subject | Teacher |
|---|---|---|---|
| **V HONS** | **Parasitology** DSE T3 | **Introduction to Parasitology**<br>1. Brief introduction of Parasitism, Parasite, Parasitoid and Vectors (mechanical and biological vector)<br>2. Host parasite relationship | EM |
| | | **Parasitic Protists**<br>Study of Morphology, Life Cycle, Prevalence, Epidemiology, Pathogenicity, Diagnosis, Prophylaxis and Treatment of *Giardia intestinalis, Trypanosoma gambiense, Leishmania donovani* | EM |
| | | **Parasitic Platyhelminthes**<br>Study of Morphology, Life Cycle, Prevalence, Epidemiology, Pathogenicity, Diagnosis, Prophylaxis and Treatment of *Schistosoma haematobium, Taenia sajinata* | EM |
| | | **ParasiticNematodes**<br>1. Study of Morphology, Life Cycle, Prevalence, Epidemiology, Pathogenicity, Diagnosis, Prophylaxis and Treatment of *Ascaris lumbricoides, Ancylostoma duodenale, Wuchereria bancrofti and Trichinella spiralis, Brugiamalayi;*<br>2. Nematode plant interaction ; Gall formation | PP |
| | | **Parasitic Arthropods**<br>Biology, importance and control of ticks (Soft tick *Ornithodoros,* Hard tick *Ixodes*),mites (*Sarcoptes*), Lice (*Pediculus*),Flea (*Xenopsylla*) and Bug (*Cimex*) | PP |
| | | **Parasite Vertebrates**<br>Brief account of Cookicutter Shark, Hood Mocking bird, Vampire bat | PP |

| SEM | Paper | Subject | Teacher |
|---|---|---|---|
| **V HONS** | **Biology of Insects DSE T4** | **Introduction**<br>1. General Features of Insects<br>2. Distribution and Success of Insects on the Earth | EM |
| | | **Insect Taxonomy**<br>Basis of insect classification; Classification of insects up to orders (according to Brusca and Brusca, 2016) | EM |
| | | **General Morphology of Insects**<br>1. External Features; Head–Eyes, Types of antennae, Mouth parts w.r.t .feeding habits<br>2. Thorax: Wings and wing articulation, Types of Legs adapted to diverse habitat<br>3. Abdominal appendages and genitalia | EM |
| | | **Physiology of Insects**<br>1. Structure and physiology of Insect body systems - Integumentary, digestive, excretory, circulatory, respiratory, endocrine, reproductive, and nervous system<br>2. Photoreceptors: Types, Structure and Function<br>3. Metamorphosis: Types and Neuroendocrine control of metamorphosis | PP |
| | | **Insect Society**<br>1. Social insects with special reference to termites<br>2. Trophallaxis in social insects such as ants, termites and bees | PP |
| | | **Insect Plant Interaction**<br>1. Theory of co-evolution, role of allelochemicals in host-plant mediation<br>2. Host-plant selection by phytophagous insects,<br>3. Major insect pests in paddy | PP |
| | | **Insects as Vectors**<br>1. Insects as mechanical and biological vectors,<br>2. Brief discussion on houseflies and mosquitoes as important vectors | PP |

## DSE- 1 General

| SEM | PAPER | SUBJECT | TEACHER |
|---|---|---|---|
| **V HONS** | **Applied Zoology** DSE-1 | **Introduction to Host-parasite Relationship** Host, Definitive host, Intermediate host, Parasitism, Symbiosis, Commensalism, Reservoir, Zoonosis. | SRD |
| | | **Epidemiology of Diseases** Transmission, Prevention and control of diseases: Tuberculosis, Typhoid | EM |
| | | **Rickettsia and Spirochetes** Brief account of **Rickettsia prowazekii**, *Borrelia recurrentis and Treponema pallidum*. | EM |
| | | **Parasitic Protozoa** Life history and pathogenicity of *Entamoeba histolytica*, *Plasmodium vivax* and *Trypanosoma gambiense* | SRD |
| | | **Parasitic Helminthes** Life history and pathogenicity of *Ancylostoma duodenale* and *Wuchereria bancrofti* | SRD |
| | | **Insects of Economic Importance** Biology, Control and damage caused by *Helicoverpa armigera, Pyrilla perpusilla and Papilio demoleus, Callosobruchus chinensis, Sitophilus oryzae and Tribolium castaneum* | EM |
| | | **Insects of Medical Importance** Medical importance and control of *Pediculus humanus corporis, Anopheles, Culex, Aedes, Xenopsylla cheopis* | EM |
| | | **Animal Husbandry** Preservation of semen and artificial insemination in cattle | EM |
| | | **Poultry Farming** Principles of poultry breeding, Management of breeding stock and broilers, Processing and preservation of eggs | EM |
| | | **Fish Technology** Genetic improvements in aquaculture industry; Induced breeding and transportation of fish seed | EM |

| SEM | PAPER | SUBJECT | TEACHER |
|---|---|---|---|
| **V HONS** | **AQUATIC BIOLOGY** DSE-1 | **Aquatic Biomes** Brief introduction to the aquatic biomes: Fresh water ecosystem(lakes, wetlands, streams and rivers), estuaries, intertidal zones, oceanic pelagic zone, marine benthic zone and coral reefs | EM |
| | | **Freshwater Biology** **Lakes**: Origin and classification, Lake as an Ecosystem, Lake morphometry, Physico–chemical Characteristics: Light, Temperature, Thermal stratification, Dissolved Solids, Carbonate, Bicarbonates, Phosphates and Nitrates, Turbidity, dissolved gases (Oxygen, Carbon dioxide). Nutrient Cycles in Lakes (Nitrogen, Sulphur and Phosphorous). **Streams**: Different stages of stream development, Physico-chemical environment, Adaptation of hill- stream fishes. | EM |
| | | **Marine Biology** Salinity and density of Sea water, Continental shelf, Adaptations of deep sea organisms, Coral reefs, Sea weeds. | EM |
| | | **Management of Aquatic Resources** Causes of pollution: Agricultural, Industrial, Sewage, Thermal and Oil spills, Eutrophication, Management and conservation (legislations), Sewage treatment; Water quality assessment- BOD and COD. | SRD |

## SEC 3

| Paper | Subject | Teacher |
|---|---|---|
| **SERICULTURE SEC 3** | **Introduction**<br>Sericulture: Definition, history and present status; Silk route<br>Types of silkworms, Distribution and Races; Exotic and indigenous races; Mulberry and non-mulberry Sericulture | SND |
| | **Biology of Silkworm**<br>Life cycle of *Bombyx mori*; Structure of silk gland and secretion of silk | SND |
| | **Rearing of Silkworms**<br>Selection of mulberry variety and establishment of mulberry garden; Rearing house and rearing appliances; Disinfectants: Formalin, bleaching powder, RKO. Silkworm rearing technology: Early age and Late age rearing.<br>Types of mountages; Spinning, harvesting and storage of cocoons | PP |
| | **Pests and Diseases**<br>Pests of silkworm: Uzi fly, demisted beetles and vertebrates Pathogenesis of silkworm diseases: Protozoan, viral, fungal and bacterial<br>Control and prevention of pests and diseases | SND |
| | **Entrepreneurship in Sericulture**<br>Prospectus of Sericulture in India: Sericulture industry in different states, employment, potential in mulberry and non-mulberry sericulture.<br>Visit to various sericulture centers. | PP |

## CC-11 [Practical]

| Sem | Topic | Subject | Teacher |
|---|---|---|---|
| V HONS | **Molecular Biology** CC-11 | Preparation of polytene chromosome from Diptera (*Chironomus/ Drosophila/ Mosquito larva*) | PKM |
| | | Identification of polytene and lampbrush chromosome from photograph | |
| | | Isolation and quantification of genomic DNA using spectrophotometer (A260 measurement) (demonstration only) | |
| | | Demonstration of agarose gel electrophoresis for DNA | |
| | | Study and interpretation of electron micrographs/ photographs showing a) DNA replication b) Transcription c) Split genes | |
| | | Preparation of liquid and solid bacterial culture media, slant and stab | |
| | | Demonstration of antibiotic sensitivity/ resistance of bacteria to antibiotic discs | |

## CC-12 [Practical]

| Sem | Topic | Subject | Teacher |
|---|---|---|---|
| V HONS | **Genetics** CC-12 | Chi-square analyses | SAD |
| | | Problems of linkage maps on Drosophila | |
| | | Identification of chromosomal aberration in Drosophila (inversion, ring chromosome, paracentric inversion) from photograph | |
| | | Study of human karyotype, normal and abnormal (Down, Klinefelter, Turner's, Cri-du-Chat) from photograph | |
| | | Pedigree analysis of some human inherited traits (X-linked dominant, X-linked recessive, autosomal dominant, autosomal recessive, Y-linked) | |

## DSE 1 [Practical]

| Sem | Topic | Subject | Teacher |
|---|---|---|---|
| V HONS | **Animal Biotechnology** DSE P1 | . Construction of linear restriction map from the data provided. | BS |
| | | Calculation of transformation efficiency from the data provided. | |
| | | Study and identification of following techniques through photographs<br>a. Southern Blotting<br>b. Northern Blotting<br>c. Western Blotting<br>d. DNA Sequencing (Sanger's Method)<br>e. PCR<br>f. DNA fingerprinting | |
| | | Project report on animal cell culture | |

**or**

## DSE 2 [Practical]

| Sem | Topic | Subject | Teacher |
|---|---|---|---|
| V HONS | **DSE P2- Microbiology** | Simple staining and Gram's staining of bacteria | BS |
| | | Preparation of liquid media (broth) and solid media for routine cultivation of bacteria. | |
| | | Preparation of slant and stab. | |
| | | Pure culture techniques: Spread plate, Pour plate and Streak plate | |
| | | Biochemical test for characterization, Catalase, Nitrate-reduction, Indole production, Methyl Red and Voges-Proskauer Test. | |
| | | Microbiological examination of milk (Methylene blue reductase test), Sugar fermentation test | |
| | | Submission of project report on water or soil bacteria | |

## DSE P3 [Practical]

| Sem | Topic | Subject | Teacher |
|---|---|---|---|
| V HONS | **Parasitology** DSE P3 | Identification of life stages of Giardia lamblia and Leishmania donovani through permanent slides/microphotographs | EM |
| | | . Identification of adult and life stages of *Schistosoma haematobium,Taenia solium* through permanent slides/microphotographs | |
| | | Identification of adult and life stages of *Ancylostoma duodenale, Wuchereria bancrofti* and *Trichinella spiralis* through permanent slides/microphotographs | |
| | | Identification of plant parasitic root knot nematode, *Meloidogyne* from the soil sample | |
| | | . Identification *of Pediculus humanus, Xenopsyll acheopis and Cimex lectularius* through permanent slides/photographs | |
| | | Isolation and fixation of nematode/cestode parasites from the intestine of hen[Intestine can be procured from poultry/market as a by-product] | |
| | | Submission of a project report on any parasite of vertebrates | |

**Or**

## DSE P4 [Practical]

| Sem | Topic | Subject | Teacher |
|---|---|---|---|
| V HONS | **Biology of Insects** DSE P4 | Study of life cycle of Mosquito | EM |
| | | Mounting and identification of different kinds of antennae, legs and mouth parts of insects | |
| | | Mounting of insect wings, spiracles and genitalia of any insects | |
| | | Methodology of collection, preservation and identification of insects. | |
| | | Morphological studies of various castes of *Apis, Camponotus, Odontotermes* | |
| | | Identification of major insect pests of paddy and their damages (*Nilaparvata, Scirpophaga, Hispa*) | |
| | | Identification of Mulberry silk moth as beneficial insect | |

## DSE-1 [Practical]

| Sem | Topic | Subject | Teacher |
|---|---|---|---|
| V GEN | Applied Zoology DSE-1 | Study and Identification of *Plasmodium vivax, Entamoeba histolytica, Ancylostoma duodenale and Wuchereria bancrofti* and their life stages through permanent slides/photomicrographs or specimens. | PP |
| | | Study and Identification of arthropod vectors associated with human diseases: *Pediculus, Culex,Anopheles, Aedes and Xenopsylla.* | |
| | | Study and Identification of insect damage to different plant parts/stored grains through damaged products/photographs. | |
| | | Identifying features and economic importance of *Nilaparvata lugens, Apion corchori, Scirpophaga incertulus, Callosobruchus chinensis, Sitophilus oryzae and Tribolium castaneum* | |
| | | Visit to poultry farm/ animal breeding centre/ vector biology/ parasitology Centre. Submission of visit report | |
| | | Maintenance of freshwater aquarium | |

**or**

| Sem | Topic | Subject | Teacher |
|---|---|---|---|
| V GEN | Aquatic Biology DSE-1 | Determine the area of a lake using graphimetric and gravimetric method. | PP |
| | | Identify the important macrophytes, phytoplanktons and zooplanktons present in a lake ecosystem. | |
| | | Determine the amount of transparency, Dissolved Oxygen, and Free Carbon dioxide, in water collected from a nearby lake / water body. | |
| | | Instruments used in limnology (Secchi disc, Van Dorn Bottle, Conductivity meter, Turbidity meter, PONAR grab sampler) and their significance. | |
| | | A Project Report on a Sewage treatment plant/Marine bio reserve/ Fisheries Institutes | |

# Routine

**RABINDRA MAHAVIDYALAYA**

**Department of Zoology**

**Total classes** 80

**CLASS ROUTINE FOR THE SESSION 2020-21 w.e.f. 01.09.2020**

| DAY | 10:30-11:30 | | | 11:30-12:30 | | | 12.30-13.30 | | | 14.30-15.30 | | | 15.30-16.30 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Monday | 3-ZOOH- | SND | 0 | 1-ZOOH- | SND | 0 | 1-ZOOH- | SND | 0 | 3-ZOOH- | PKM | 0 | 3-ZOOH- | PKM | 0 | |
| | 5-ZOOH- | SRD | 0 | 3-ZOOG- | EM | 0 | 3-ZOOG- | EM | 0 | 5-ZOOG- | SND | 0 | 5-ZOOH- | BS | 0 | |
| | | | | 3-ZOOH- | PP | 0 | 3-ZOOH- | PKM | 0 | 5-ZOOH- | BS | 0 | | | | |
| | | | | 5-ZOOH- | SRD | 0 | 5-ZOOH- | BS | 0 | | | | | | | 15 |
| Tuesday | 3-ZOOH- | EM | 0 | 1-ZOOG- | SRD | 0 | 1-ZOOH- | BS | 0 | 3-ZOOH- | BS | 0 | 3-ZOOH- | BS | 0 | |
| | 5-ZOOH- | SRD | 0 | 1-ZOOH- | BS | 0 | 5-ZOOH- | PKM | 0 | 5-ZOOH- | PKM | 0 | 5-ZOOH- | PKM | 0 | |
| | | | | 3-ZOOH- | EM | 0 | | | | | | | | | | |
| | | | | 5-ZOOH- | PP | 0 | | | | | | | | | | 12 |
| Wednessday | 3-ZOOG- | SRD | 0 | 1-ZOOG- | EM | 0 | 1-ZOOG- | EM | 0 | 5-ZOOG- | PP | 0 | 5-ZOOG- | PP | 0 | |
| | 5-ZOOH- | EM | 0 | 1-ZOOH- | PP | 0 | 1-ZOOH- | PP | 0 | 5-ZOOH- | BS | 0 | 5-ZOOH- | BS | 0 | |
| | | | | 3-ZOOG- | SRD | 0 | 3-ZOOH- | PKM | 0 | | | | | | | |
| | | | | 5-ZOOH- | SND | 0 | 5-ZOOH- | SND | 0 | | | | | | | 14 |
| Thursday | 3-ZOOG- | EM | 0 | 3-ZOOH- | SRD | 0 | 5-ZOOH- | BS | 0 | 3-ZOOH- | PP | 0 | 3-ZOOH- | PP | 0 | |
| | 3-ZOOH- | SRD | 0 | 5-ZOOH- | SND | 0 | | | | 5-ZOOG- | EM | 0 | 5-ZOOG- | EM | 0 | |
| | 5-ZOOH- | SND | 0 | | | | | | | 5-ZOOH- | PKM | 0 | 5-ZOOH- | PKM | 0 | |
| | | | | | | | | | | | | | | | | 12 |
| Friday | 3-ZOOH- | PP | 0 | 1-ZOOH- | EM | 0 | 1-ZOOG- | SRD | 0 | 1-ZOOH- | PKM | 0 | 1-ZOOH- | PKM | 0 | |
| | 5-ZOOH- | SND | 0 | 3-ZOOG- | SRD | 0 | 1-ZOOH- | EM | 0 | 5-ZOOH- | BS | 0 | 3-ZOOH- | BS | 0 | |
| | | | | 3-ZOOH- | PP | 0 | 3-ZOOH- | PP | 0 | | | | 5-ZOOH- | SND | 0 | |
| | | | | 5-ZOOH- | SND | 0 | 5-ZOOH- | SND | 0 | | | | | | | |
| | | | | | | | | | | | | | | | | 15 |
| Saturday | 3-ZOOH- | SND | 0 | 3-ZOOH- | EM | 0 | 3-ZOOH- | BS | 0 | 1-ZOOH- | SRD | 0 | 1-ZOOG- | EM | 0 | |
| | 5-ZOOH- | PKM | 0 | 5-ZOOH- | SRD | 0 | 5-ZOOG- | SRD | 0 | 3-ZOOH- | PKM | 0 | 1-ZOOH- | SRD | 0 | |
| | | | | | | | 5-ZOOH- | PP | 0 | 5-ZOOH- | PP | 0 | | | | |
| | | | | | | | | | | | | | | | | 12 |
| | 13 | | | 20 | | | 18 | | | 15 | | | 14 | | | |