

SYLLABUS PLAN (2018-19)
ODD SEMESTERS

SYLLABUS PLAN (2018-19)

NAME OF THE TEACHER

- Dr. Imtiaz Khan

CLASS

- B. Sc. I (Medical), Semester-I

SUBJECT

- Zoology (Cell biology & animal diversity, Biodiversity I)

Month	THEORY	PRACTICAL
July	<p>Methods in Cell Biology: Principles of light and electron microscopes, fixation and fixatives, staining techniques (single and double).</p>	
August	<p>Organisation of Cell: Extra nuclear and nuclear ultrastructure and functions of cell organelles.</p> <p>(a) Plasma membrane: Structure, osmosis, active and passive transport, endocytosis and exocytosis.</p> <p>(b) Endoplasmic reticulum: Structure, types and associated enzymes.</p> <p>(c) Golgi Complex: Structure and functions.</p> <p>(d) Ribosomes: Types of ribosomes, their structure and functions.</p> <p>Lysosomes: Polymorphism and their function.</p> <p>Organisation of Cell: Extra nuclear and nuclear ultrastructure and functions of cell organelles.</p> <p>(e) Mitochondria: Structure, mitochondrial enzymes and the role of mitochondria in respiration.</p> <p>(f) Centrosome: Structure and functions.</p> <p>(g) Nucleus: Structure and functions of nuclear membrane, nucleolus and chromosomes.</p>	<p>Protozoa:</p> <p>Examination of cultures of <i>Euglena</i> and <i>Paramecium</i>.</p> <p>Slides:</p> <p><i>Amoeba, Euglena, Trypanosoma, Noctiluca, Eimeria, Monocystis, Paramecium (Binary fission and conjugation), Opalina, Vorticella, Balantidium, Nyctotherus & Polystomella.</i></p> <p>Porifera :</p> <p>Specimens:</p> <p><i>Sycon, Grantia, Euplectella, Hyalonema, Spongilla</i> and <i>Euspongia</i>.</p> <p>Coelenterata:</p> <p>Specimens:</p> <p><i>Porpita, Velella, Physalia, Aurelia, Rhizostoma, Metridium, Millipora, Alcyonium, Tubipora, Zoanthus, Madrepora, Favia, Fungia</i> and <i>Astrangia</i>.</p> <p>Slides:</p> <p><i>Hydra (W.M.), Hydra</i> with buds, <i>Obelia</i> (colony and medusa), <i>Sertularia, Plumularia, Tubularia, Bougainvillea</i> and <i>Aurelia</i>.</p>

<p>SEPTEMBER</p>	<p>Type Study-I (Protozoa to Porifera)</p> <p>1. Protozoa: Classification upto orders with brief ecological note and economic importance of the following: <i>Entamoeba, Trypanosoma, Giardia, Noctiluca, Eimeria, Opalina, Vorticella, Balantidium</i> and <i>Nyctotherus</i>. Detailed study of the following animal types: <i>Amoeba, Paramecium</i> and <i>Plasmodium</i>. Introduction to Parasitic Protozoa</p> <p>2. Porifera : Classification upto orders with brief ecological note and economic importance of the following: <i>Grantia, Euplectella, Hyalonema</i> and <i>Spongilla</i>. Detailed study of the following animal types: <i>Sycon</i></p> <p>Type Study-II (Coelenterata to Annelida)</p> <p>Coelenterata : Classification upto orders with brief ecological note and economic importance of the following : <i>Hydra, Sertularia, Plumularia, Obelia, Tubularia, Bougainvillea, Porpita, Velella, Physalia, Rhizostoma, Millipora, Aurelia, Alcyonium, Tubipora, Zoanthus, Metridium, Madrepora, Favia, Fungia</i> and <i>Astrangia</i>. Detailed study of the following animal types: <i>Obelia</i></p>	<p>Preparation of the following slides:</p> <p>Preparation of permanent whole mount stained in borax carmine : <i>Hydra, Obelia, Sertularia, Plumularia</i> and <i>Bougainvillea</i>.</p> <p>Platyhelminthes:</p> <p>Specimens: <i>Dugesia, Fasciola, Taenia</i> and <i>Echinococcus</i>.</p> <p>Slides: Miracidium, Sporocyst, Redia, Cercaria of <i>Fasciola</i>, Scolex and Proglottids of <i>Taenia</i> (mature and gravid)</p> <p>Aschelminthes: <i>Ascaris</i> (male and female), <i>Trichinella</i> and <i>Ancylostoma</i>.</p>
<p>OCTOBER</p>	<p>Platyhelminthes : Classification upto orders with brief ecological note and economic importance of the following : <i>Dugesia, Schistosoma</i> and <i>Echinococcus</i>.</p>	<p>Major dissection (demonstration): <i>Pheretima</i> (Earthworm): Digestive, reproductive and nervous systems.</p>

	<p>Detailed study of the following animal types :<i>Fasciola, Taenia</i></p> <p>Aschelminthes :</p> <p>Classification upto orders with brief ecological note and economic importance of the following:<i>Ascaris, Oxyuris</i> and <i>Wuchereria</i></p> <p>Detailed study of the following animal types:<i>Ascaris</i>, Parasitic adaptations in Helminths</p>	
NOVEMBER	<p>Detailed study of the following animal types: <i>Pheretima</i> (Earthworm)</p>	<p>Annelida:</p> <p>Specimens :</p> <p><i>Pheretima, Nereis, Heteronereis, Polynoe, Eunice, Aphrodite, Chaetopterus, Arenicola, Tubifex</i> and <i>Pontobdella</i>.</p> <p>Study of the following permanent stained preparations :</p> <ul style="list-style-type: none"> a) L.S. and T.S. <i>Sycon</i>, Gemmules, Spicules and Spongin fibres of a sponge. b) T.S. <i>Hydra</i> (Testis and ovary region) c) T.S. <i>Fasciola</i> (Different regions) d) T.S. <i>Ascaris</i> (Male and Female) <p>T.S. <i>Pheretima</i> (Pharyngeal and typhlosolar regions), setae, septal nephridia, spermathecae and ovary.</p>

NAME OF THE TEACHER
CLASS
SUBJECT

- Prof. Supinder Kaur
- B. Sc. II (Medical), Semester-III
- Zoology (Chordates I, Chordates II & Evolution)

Month	THEORY	PRACTICAL
July	<p>Chordates : General Characters and Echinoderm Theory of Origin 2. Protochordates: a) Urochordata Type study-Herdmania.</p>	<p>I. Classification up to orders, excepting Pisces and Aves where classification up to subclasses only is required, habits, habitats, external characters and economic importance (if any) of the following animals: 1. Urochordata : Herdmania, Molgula, Pyrosoma, Dolilum, Salpa and Oikopleura. 2. Cephalochordata : Amphioxus. 3. Chondrichthyes : Zygaena (Hammer headed shark), Pristis (saw fish), Narcine (Electric ray), Trygon, Rhinobatus and Chimaera (Rabbit fish).</p>
August	<p>Chordates : General Characters and Echinoderm Theory of Origin 2. Protochordates: b) Cephalochordata— Type study-Amphioxus. c) Classification of following animals upto orders Herdmania, Molgula, Pyrosoma, Dolilum, Salpa, Oikopleura and Amphioxus. Cyclostomata: a) External Characters of Petromyzon. b) Affinities of Cyclostomata. c) Classification of following animals upto orders Myxine, Petromyzon and Ammocoetus Larva.</p>	<p>I. Classification up to orders, excepting Pisces and Aves where classification up to subclasses only is required, habits, habitats, external characters and economic importance (if any) of the following animals: 4. Actinopterygii : Polypterus, Acipenser, Lepidosteus, Muraena, Mystus, Catla, Hippocampus, Syngnathus, Exocoetus, Anabas, Diodon, Tetradon, Echeineis and Solea. 5. Dipnusti (Dipnoi) : Protopterus (African lung fish). 6. Amphibia : Uraeotyphlus, Necturus, Amphiuma, Amblystoma and its Axolotl Larva, Triton, Salamandra, Hyla and Rhacophorus. 7. Reptilia : Hemidactylus, Calotes, Draco, Varanus, Phrynosoma, Chamaeleon, Typhlops, Python, Eryx, Ptyas, Bungarus, Naja, Hydrus, Viper, Crocodilus, Gavialis, Chelone (Turtle) and Testudo (Tortoise). 8. Aves : Ardea, Anas, Milvus, Pavo, Tyto, Alcedo, Eudynamis and Casuarius. 9. Mammalia : Ornithorhynchus, Echidna, Didelphys, Macropus, Loris,</p>

		Macaca, Manis, Hystrix, Funambulus, Panthera, Canis, Herpestes and Pteropus.
SEPTEMBER	<p>Pisces: a) Type study : Labeo. b) Types of Scales, Migration and Parental Care in fishes. c) Classification of following animals upto orders i. Chondrichthyes : Zygaena, Pristis, Narcine, Trygon, Rhinobatus and Chimaera. ii. Actinopterygii: Polypterus, Acipenser, Lepidosteus, Muraena, Mystus, Catla, Hippocampus, Syngnathus, Exocoetus, Anabas, Diodon, Tetradon, Echeneis and Solea. iii. Dipnusti (Dipnoi): Protopterus (lung-fish).</p> <p>Amphibia: a) Type study –Frog. b) Parental Care. c) Classification of animals upto orders Uraeotyphlus, Necturus, Amphiuma, Amblystoma, Triton, Salamandra, Hyla, Rhacophorus.</p>	2. Demonstration of the following animals: 1. Herdmania : General anatomy. 2. Labeo Digestive systems, reproductive systems and cranial nerves. 3. Chick : Digestive, arterial, venous and urinogential systems. 4. White Rat : Digestive, arterial, venous and urinogential systems.
OCTOBER	<p>Reptilia : a) Type study—Uromastix b) Poison apparatus in snakes. c) Classification of following animals upto orders Chelone, Testudo, Hemidactylus, Calotes, Draco, Varanus, Phrynosoma, Chamaeleon, Typhlops, Python, Eryx, Bungarus, Naja, Hydrus, Viper, Crocodilus, Gavialis and Alligator. Aves : a) Type study—Pigeon. b) Flight and beak adaptations c) Classification of following animals upto orders Ardea, Milvus, Pavo, Tyto, Alcedo, Eudynamis and Casuarius</p>	<p>3. Make temporary preparation of following: 1. Temporary preparation of spicules of Herdmania. 2. Permanent preparation of whole mount of placoid scales of Scoliodon. 5. Study of fossil evidences from plaster cast models and pictures</p> <p>Visit to fossil Museum and submission of report</p>
NOVEMBER	<p>Mammals : a) Type study—Rat. b) Dentition in Mammals. c) Classification of following animals up to orders Ornithorhynchus, Echidna, Didelphys, Macropus, Loris, Macaca, Manis, Hystrix, Funambulus, Panthera, Canis, Herpestes, Capra, Pteropus. Organic Evolution: i) Origin of life: Theory of origin of Life, Chemical Origin of life, Biological Evolution ii) Evidences of organic evolution: Homologous and Analogous Organs, Divergent and Convergent Evolution, Vestigial Organs, Evidences of</p>	4. Study of following prepared slides : T.S. Amphioxus through various regions. Spicules, pharynx of Herdmania and pharynx of Amphioxus. Histology of rat/rabbit (Compound tissues).

	Atavism, Recapitulation theory, Missing links, connecting links iii) Theories of organic evolution (Lamarckism, Darwinism, Neo-Darwinism and modern synthetic theory), Modes of speciation (Allopatric, Parapatric, Sympatric), Isolating mechanism, Examples of Geographic speciation, Sibling species, Genetic drift iv) Evolution of man: Microevolution, Macroevolution, Megaevolution (definition and examples)	
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NAME OF THE TEACHER

- Prof. Arshdeep Kaur

CLASS

- B. Sc. III (Medical), Semester-V

SUBJECT

- Zoology (Developmental Biology, Parasitology & Immunology)

Month	Syllabus	
	Theory	Practical
July		
August	<ol style="list-style-type: none"> 1. Gametogenesis with particular reference to differentiation of spermatozoa : vitellogenesis, role of follicle/ subtesticular cells in gametogenesis. 2. Introduction to Parasitology (pertaining to various terminologies in use). 3. Brief Introduction to pathogenic microbes. Viruses, Rickettsiae, Spirochaetes and Bacteria. 	<ol style="list-style-type: none"> 1. Study of the development of frog from permanent slides. 2. Study of the development of chick embryo form permanent slides upto 96 hours.
September	<ol style="list-style-type: none"> 1. Egg maturation : egg membranes, polarity of egg. 2. Fertilization; parthenogenesis, Cleavage patterns. 3. Basic concepts of organizers and inducers and their role. 4. Brief accounts of life history, mode of infection and pathogenicity of the 	<ol style="list-style-type: none"> 1. Study of the following prepared slides: <ol style="list-style-type: none"> a. Stages of gametogenesis, structure of egg and sperm of a mammal. b. Larva of <i>Herdmania</i>

	<p>following pathogens with reference to man; prophylaxis and treatment :</p> <p>a. Pathogenic protozoans : <i>Entamoeba</i>, <i>Trypanosoma</i>, <i>Leishmania</i>, <i>Giardia</i>, <i>Trichomonas</i> and <i>Plasmodium</i>.</p> <p>b. Pathogenic helminthes : <i>Fasciolopsis</i>, <i>Schistosoma</i>, <i>Echinococcus</i>, <i>Ancylostoma</i>, <i>Trichinella</i>, <i>Wuchereria</i>, <i>Dracunculus</i> and <i>Oxyuris</i>.</p> <p>5. Life cycle and control measures of arthropod vectors of human diseases : Malaira (<i>Anopheles stephensi</i>, <i>A culicifacies</i>) Yellow fever and Dengue, Haemorrhagic fever (<i>Aedes aegypti</i>, <i>A. albopictus</i>); Filariasis (<i>Culex pipiens fatigans</i>) <i>Mansoniasp.</i>, Japanese Encephalitis (<i>C. tritaeniorhynchus</i>).</p>	
October	<p>1. Basic concepts of organizers and induce Embryonic development: Cleavage, determination and differentiation, development upto three germ layers and their fate in <i>Herdmania</i>, <i>Amphioxus</i>, frog, chick and rabbit and their role.</p> <p>1.Epidemic deiseases such as typhoid, cholera, small pox; their occurrence and eradiction programmes.</p> <p>2.Brief introduction to human defence mechanisms.Humoral and cell mediated immune-response, Antigens-physical & chemical properties</p>	<p>1.Preparation of thick and thin film for malarial parasite.</p> <p>2.Study of permanent slides and specimens of parasite protozoans helminthes, arthropods, mentioned in theory syllabus.</p>
November	<p>1. Metamorphosis in <i>Herdmania</i> and Rana (Frog).</p> <p>2. Foetal membranes, their formation and role. Mammalian placenta, its formation, types and functions.</p>	<p>1. Examination of stool for demonstration of intestinal parasites.</p> <p>2. Demonstration of ELISA.</p>

	<ol style="list-style-type: none">3. Antibodies-structure and function of immunoglobulin M, G, A, E and D.4. Antigen and antibody interactions : Serodiagnostic assays.5. Vaccines.	
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SYLLABUS PLAN (2018-19)
EVEN SEMESTERS

SYLLABUS PLAN (2018-19)

NAME OF THE TEACHER

- Dr. Imtiaz Khan

CLASS

- B. Sc. III (Medical), Semester-VI

SUBJECT

- Zoology (Reproductive Biology, Medical Laboratory Technology)

Month	THEORY	PRACTICAL
January	<p>Laboratory safety rules, hazards and precautions during sample collection and laboratory investigations.</p> <p>Laboratory techniques: Microscopy</p> <p>Histopathology: Common fixatives and staining techniques,</p>	<p>Demonstration of parts of microscope, its functioning and care.</p> <p>Demonstration of safety rules in laboratory.</p> <p>Estimation of haemoglobin using Shali's haemometer.</p> <p>Analysis of blood group, A, B, AB, O and Rh.</p>
February	<p>Laboratory techniques: Colorimetry, Autoclaving, Centrifugation, Spectrophotometry.</p> <p>Collection, Transportation and Preservation of different clinical samples.</p> <p>Bacteriology : Sterilisation, (dry heat, moist heat, autoclave, filtration), Disinfection, Staining techniques (gram's stain, AFB stain, etc), Culture media (Defined & Synthetic media & routine laboratory media), Bacterial culture (aerobic and anaerobic), antibiotic sensitivity.</p>	<p>Demonstration of the use of autoclave, centrifuge and spectrophotometer.</p> <p>Cleaning and sterilization of glassware using hot air oven, autoclave etc.</p> <p>Processing of clinical samples for culture and identification of pathogens: blood, sputum, urine, throat and body swab.</p> <p>Counting of WBC, RBC & DLC.</p>

	<p>Haematology : Collection of blood (Venous and Capillary), Anticoagulants (merits and demerits). Romanowsky's stains. Total RBC count, Erythrocyte sedimentation rate, TLC, DLC, Eosinophil count, Platelet count, Reticulocyte count.</p> <p>Biochemistry : Animal tissue- total carbohydrates, protein and lipids; Blood-glucose, cholesterol, urea, protein; Enzyme- amylase, acid and alkaline phosphatase.</p> <p>Histochemistry: Principle and method: Staining of carbohydrates, proteins and fats with bromo phenol blue, Periodic acid Schiff, Sudan Black blue.</p>	<p>ESR, bleeding time, coagulation time.</p>
March	<p>Reproductive Endocrinology - hypothalamo – hypophyseal – gonadal axis, regulation of gonadotrophin secretion in male and female; Reproductive System: Development and differentiation of gonads, mechanism of sex differentiation.</p> <p>Functional anatomy and histology of of testis in rat, Spermatogenesis, Epididymal function and sperm maturation</p> <p>Accessory sex glands and their functions</p> <p>Amniocentesis</p>	<p>Estimation of blood sugar, serum urea, protein.</p> <p>Examination of histological sections from photomicrographs/ permanent slides of rat/human: testis, epididymis and accessory glands of male reproductive systems, sections of ovary, fallopian tube, uterus.</p> <p>Visit to instrumentation centre and semen station Nabha/Patiala.</p>
April	<p>Functional anatomy and histology of ovary, oogenesis, Ovum transport in the fallopian tubes; Sperm transport in the female tract.</p> <p>Fertilization, implantation, gestation: hormonal control and regulation</p>	

	<p>Mechanism of parturition and its hormonal regulation</p> <p>Lactation and its regulation</p> <p>Assisted Reproductive Technology: pregnancy diagnosis, sperm banks, frozen embryos, in vitro fertilization, artificial insemination and IUT.</p>	
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NAME OF THE TEACHER

- Prof. Arshdeep Kaur

CLASS

- B. Sc. II (Medical), Semester-IV

SUBJECT

- Zoology (Biochemistry, Animal Physiology)

Month	Syllabus	
	Theory	Practical
August	<p>Biochemistry and its scope; Carbohydrates, Proteins and Lipids (classification, structure, functions).</p> <p>Nucleic Acids : Nucleotides, Nucleosides, Structure of DNA & RNA, functions 3. Enzymes: Nature, their classification, factors affecting enzyme activity, coenzymes.</p>	<p>Identification of food stuffs: starch, glucose, proteins and fats in a given solution.</p> <p>Demonstration of osmosis and diffusion.</p>
September	<p>Carbohydrate Metabolism: The Embden Meyerhof, Parnas Pathway (Glycolysis), the tricarboxylic acid cycle, the hexose monophosphate shunt, glycogenesis and glycogenolysis.</p> <p>Lipid Metabolism: β-oxidation of fatty acids, fate of glycerol and gluconeogenesis, interaction of carbohydrates and lipids, lipogenesis in tissues, ketosis.</p>	<p>Demonstration of presence of amylase in saliva, denaturation with change of pH and temperature.</p> <p>Analysis of urine for urea and glucose.</p> <p>Determination of coagulation and bleeding time of blood in man/rat/rabbit.</p>
October	<p>Protein Metabolism: Metabolism of amino acids (Oxidative deamination, transamination and</p>	<p>Determination of blood groups of human blood sample.</p>

	<p>decarboxylation) hydrolysis of protein and ornithine cycle.</p> <p>Digestion : Digestion of dietary constituents, regulation of digestive processes and absorption, types of nutrition, feeding mechanism, extra and intra cellular digestion, enzymatic digestion and symbiotic digestion.</p> <p>Circulation : Composition and functions of blood and lymph, molecular structure and function of haemoglobin, blood clotting, blood groups including Rhfactor, haemostasis and haemopoiesis. Origin and regulation of heart beat, cardiac cycle, electrocardiogram, cardiac output, blood flow and its regulation, blood pressure and micro-circulation.</p>	<p>Recording of blood pressure of man.</p> <p>Estimation of haemoglobin content.</p> <p>Study of TLC and DLC. 10. Preparation and study of human blood smear.</p> <p>Study of permanent slide of striated muscles and nerve fibre.</p>
<p>November</p>	<p>Respiration : Transport of O₂ and CO₂, Oxygen dissociation curve of haemoglobin, Bohr effect, chloride shift, Haldane effect and control of breathing.</p> <p>Excretion : Urine formation and osmoregulation.</p> <p>Muscles : Ultrastructure, chemical and physiological basis of skeletal muscle contraction.</p> <p>Neural Integration : Structure of Neuron, resting membrane potential, origin and propagation of impulse along the axon, synapse and myoneural junction.</p> <p>Endocrine : Structure and physiology of thyroid; Parathyroid, adrenal, hypothalamus, pituitary, pancreas and gonads.</p>	<p>Field study: Visit to a clinical lab.</p> <p>Study of skeleton of Scoliodon, Rana, Varanus, Gallus and Oryctolagus (Rabbit)</p>

NAME OF THE TEACHER
CLASS
SUBJECT

- Prof. Supinder Kaur
- B. Sc. I (Medical), Semester-II
- Zoology (Biodiversity II & Ecology)

Month	THEORY	PRACTICAL
January	<p>Ecology: Subdivisions and scope of ecology.</p> <p>Ecosystem: Components, ecological energetics, food web, introduction to major ecosystems of the world.</p> <p>Ecological factors: Temperature, light and soil as ecological factors.</p> <p>Inter and Intra specific relationships: Competition, predation, parasitism, commensalisms & mutualism</p> <p>Environmental degradation: Causes, impact and control of air and water pollution.</p>	<p>Minor dissections:</p> <p>Mouth parts and trachea of cockroach, appendages of Prawn</p>
February	<p>Nutrients: Biogeochemical cycles and concept of limiting factors.</p> <p>Ecological adaptations: Morphological, physiological and behavioral adaptations in animals in different habitats.</p> <p>Environmental education: Importance of Biodiversity.</p> <p>Population: Characteristics and regulation of population.</p> <p>Natural resources: Renewable and non-renewable natural resources and their conservations.</p> <p>Environmental degradation: Causes, impact and control of soil and noise pollution (in general).</p>	<p>Minor dissections:</p> <p>radula of <i>Pila</i>,</p> <p>Major dissections:</p> <p><i>Periplaneta</i> (Cockroach): Digestive and nervous systems.</p> <p><i>Pila</i>: Pallial complex, digestive and nervous systems.</p> <p>ECOLOGY:</p> <p>Study of animal adaptations with the help of specimens, charts and models.</p> <p>Study of biotic components of an ecosystem.</p> <p>Study of different types of nests in birds.</p>

		Study and preparation of zoogeographical charts.
March	<p>Arthropoda:</p> <p>a. Classification upto orders with ecological notes and economic importance (if any) of the following: <i>Peripatus, Prawn, Lobster, Cancer (Crab) Sacculina, Eupagurus (Hermit crab), Lepas, Balanus, Apis, Lepisma (Silver fish), Schistocerca (Locust), Poeciloceris (AK Grasshopper), Gryllus (Cricket), Mantis (Praying Mantis), Cicada, Forficula (Earwig), Dragon fly, termite queen, bug, moth, beetle, Polistes, (Wasp), Bombyx (Silk moth), Millipede, Scolopendra (Centipede), Palamnaeus (Scorpion), Aranea (Spider) and Limulus (King crab).</i></p> <p>b. Detailed study of the following animal types: <i>Periplaneta (cockroach), Prawn and Social organizations in insects (honey bee and termite)</i></p> <p>Mollusca: a. Classification upto orders with ecological notes and economic importance (if any) of the following:</p> <p style="text-align: center;"><i>Chiton, Anodonta, Mytilus, Ostrea, Cardium, Pholas, Solen (Razor fish), Pecten,</i></p>	<p>Classification upto orders with morphological notes of the following animals :</p> <p>A. Arthropoda : <i>Peripatus, Palaemon (Prawn), Lobster, Cancer (Crab), Sacculina, Eupagurus (Hermit crab), Lepas, Balanus, Cyclops, Daphnia, Lepisma, Periplaneta (Cockroach), Schistocerca (Locust), Poeciloceris (AK grasshopper), Gryllus, (Cricket), Mantis (Praying mantis), Cicada, Forficula (Earwig), Dragonfly, termite queen, bug, moth, beetle, Polistes (Wasp), Apis (Honey bee), Bombyx, Pediculus (Body louse), Millipede and Centipede, Palamnaeus (Scorpion), Aranea (Spider), and Limulus (King crab).</i></p>

	<p><i>Haliotis, Patella, Aplysia, Doris, Limax, Loligo, Sepia, Octopus, Nautilus shell and Dentalium.</i></p> <p>b.Detailed study of the following animal types: <i>Pila</i></p>	
April	<p>Echinodermata: a.Classification upto orders with ecological notes and economic importance (if any) of the following:<i>Echinus, Cucumaria, Ophiothrix</i> and <i>Antedon</i>.</p> <p>b.Detailed study of the following animal types: <i>Asterias</i> (Starfish) and Echinoderm larvae</p> <p>Hemichordata</p> <p>a.Classification upto orders with ecological notes and economic importance (if any) of the following: <i>Balanoglossus</i></p> <p>b.Detailed study of the following animal types: <i>Balanoglossus</i> : External characters and affinities.</p>	<p>Classification upto orders with morphological notes of the following animals :</p> <p>B. Mollusca : <i>Anodonta, Mytilus, Ostrea, Cardium, Pholas, Solen (Razor fish), Pecten, Haliotis, Patella, Aplysia, Doris, Limax, Loligo, Sepia, Octopus, Nautilus shell (Complete and T.S.), Chiton and Dentalium.</i></p> <p>C. Echinodermata: <i>Asterias, Echinus, Ophiothrix and Antedon.</i></p> <p>D. Hemichordata: <i>Balanoglossus.</i></p>