

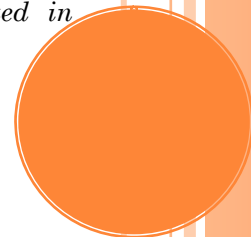
BABA FARID GROUP OF INSTITUTIONS



“Zoology is the study of animal biology and environmental study, with opportunities for lifelong research and application in many different fields. A zoology education can be applied to a variety of organizations and work environments including medical research, government programs, public policy for environmental awareness, and conservation management. Zoologists and wildlife biologists are involved with research and data collection after experiments, as well as the study of animal origins, genetics, diseases, and behaviors of animals. Common pursuits and specializations of zoology degree programs include: Animal biology, Cell biology, Animal behavior, Neurosciences, Evolutionary biology, Population biology, Ecology, Embryonic development.

A zoology education can lead to a variety of career paths and research opportunities in the field of natural sciences and animal studies, and many zoologists do work in environments other than zoos and animal clinics. The increased demand for well-trained professionals in the field of environmental and ecological studies offers more opportunities for students interested in enjoying a rewarding career in the field.”

--Dr. Dinesh Bhardwaj
In-Charge
Department of Zoology



Syllabus of M.Sc. (Zoology)-1st Year

PAPER-I NON-CHORDATA

UNIT-I

Major and minor invertebrate phyla: general characters, organisation classification and their types. Origin and evolution of lower and higher invertebrates. Adaptive radiation in Polychaeta, insects and Mollusca. Overview of economic importance of invertebrates.

UNIT-II

Protozoa: comparative morphology, skeleton, nucleus, locomotor organelles and locomotion nutrition, behaviour, osmoregulation, reproduction. Porifera: comparative morphology, canal system, skeleton, reproduction, development & affinities.

UNIT-III

Coelenterata; comparative morphology, Polymorphism, Coral formation and Coral reefs. structure and affinities of Ctenophora. Helminthes: Comparative external and internal morphology of platyhelminthes and Ascahelminthes. Features of the organ systems. Minor group: structure life history and affinities of Phoronida and Rotifera.

UNIT-IV

Annelida: Comparative morphology, coelom, locomotion, segmental organs, Arthropoda: Appendages Mouth parts, larval form in crustacea, general organisation and affinities of Arachnida. Organisation and affinities of Ctenophora, Peripatus.

UNIT-V

Mollusca: Comparative morphology, major features of the digestive, respiratory, excretory, nervous and reproductive systems, larval forms, Torsion, Pearl formation. Echinodermata: Skeletal system, Water vascular system, locomotion, Sense organs, larval forms and affinities.

PAPER II: ANIMAL BEHAVIOUR & ENDOCRINOLOGY

UNIT-I

Instinct: Definition and characteristics (Sign stimuli and Fixed action pattern) Learning behaviour: Definition, Spatial learning, Associative learning, classical conditioning, operant Conditioning, insight learning, language learning, imprinting, kin recognition. Biological rhythms. The Biological clock. Circadian rhythms and their synchronisation. Communication: Visual, olfactory, acoustic. Bird songs. Amphibian calls. communication in bats.

UNIT-II

Chemoreception: Chemicals (pheromones) as signals in insects, fishes and mammals. Role of olfaction in communication behaviour in fishes and mammals. Genetic basis of behaviour: Genetic mechanisms (examples from love birds, treefrogs, fruitflies. Artificial selection). Physiological basis of behaviour (neural and hormonal control). Components of brain involved in Control of various behaviours e.g drinking, learning, eating, activity & rest, sleep, aggression, sexual behaviour. Sociobiology and migratory behaviour.

UNIT-III

Hormones and Physiological actions of the following endocrine glands in invertebrates (Mammals, Birds, Reptile, fish): Thyroid, Parathyroid, pancreas, Gastro-intestinal tract, Adrenal cortex and Medulla, Thymus & pineal. Insect hormones & their physiological action. Endocrine messengers: hormones, neurohormones, hormones like substance (neuronal peptides. Autocoids, pheromones, neurosecretion). Feedback mechanism, stimulus secretion coupling.

UNIT-IV

Hormones biosynthesis: protein peptide hormones (gonadotropins, thyrotrophin. Corticotrophin, Steroids and catecholamines). Mechanism of action of protein hormones and Catecholamines: membrane Bound receptors G-protein and control of adenylyl cyclase, cyclic nucleotide cascade. Mechanism of action of steroid and thyroid hormones: Cytosolic receptors. Effect on transcriptional and translational processes.

UNIT-V

Hormonal control of reproduction. Organisation & physiological actions of the testis: Androgen binding protein(ABP),inhibin. Neuroendocrine control of testicular functions (Gn RH regulation,FSH-effects on germinal epithelium. LH-effects on Leydig cells, negative feed back regulation) Organisation & physiological action of the ovary: Folliculogenesis, ovulation, Luteinization, Ovarian Cycles,seasonal reproductive cycles,sexual dysfunction in man.

Recommended books:

- 1: Alcock : Animal behaviour Sinaur Association, inc,1989
- 2:goodenough et al: Perspectives on animal behaviour.Wiley & Sons,new Youk 1993.
- 3:Grier : Biology of animal behaviour, Mosby 1984.
- 4:Krebs & Davies : An introduction to behavioural ecology(3rd ed)Blackwell 1993.
- 5: Lehner : Handbook of ethological methods. Garland STPM press, New York.1979.

PAPER III : MICROBIOLOGY,PARASITOLOGY AND IMMUNOBIOLOGY

Unit –I

Microbiology, Microbiology: Bacteria – classification, staining techniques, pathological significance, aerobiology, Physiology genetics & reproduction of viruses of plants and animals. Lysogeny & lytic cycles bactriophage. Bacterial genetics. Microbial culture teching & media enrichment techniques. Microbial lermentation: Organic acids and vitamins, microbes in decomposition and recycling, processes as pathological agents in plants, animals and man, Antibiotics General design and applications of a biofemanter, biofertilizer

UNIT – II

Parasitology Parasitology : Parasitism and different types of animal associations. Evolution of parasitism Protozoan parasites.Biology,life cycle and diseases caused by selected pathogenic protozoane of man their preventive and control measures (Entamoeba histolytica, Trypanosomes, Leishmania donovani, Trichomonas vaginalis, Giardia instestinalis & Plasmodium).

UNIT-III

Heiminth : Parasitic adaptations in Platyhelminthes and Aschelminthes, Common and pematode parasites Biology, life history and preventive measures of economically important helminth parasites of man and domesticated animals (Ascaris schistosoma,Fasciols

UNIT-IV

Introduction to arthropods and veciors of human diseases (mosquitoes,lice,Lies & Ticks, Chemicals,biological & environmental control of arthropod veciors Biology & control of chief insect pests of agricultural importance Parasitism in Crustacea

UNIT – V

Immunobiology Antigen Structure and functions of different classes of immunoglobulin Primary and secondary immune response Lymphocytes and accessory calls humoral and cell – mediated immunity,MHC Mechanism of immune response and generation of immunological diversity Genetic control of immune response. Effector mechanisms Application of immunological techniques.

PAPER-IV CELL BIOLOGY, BIOTECHNOLOGY AND INSTRUMENTATION

UNIT-I

Cell Biology Ultra structure of Pro and Eukaryotic cells.

Plasma membrane: Structure organisation, lipid bilayer, proteins & glycongugates, liposomes. Function- ionic transport(symport, antiport, active and endocytosis, exocytosis), Channel proteins. Molecular basis of signal transduction. Endomembrane system: Intracellular compartments/organelles (ER, GOLGI, Lysosomes, Nuclear membrane) protein sorting, secretory and endocytic Pathways. Cytoskeleton:

Components & Functions and derived organelles (Cillium, Flgellum). Mitochondria: structure function and genetic organisation.

Unit-II

Ribosome: Biosynthesis & formation in nucleolus. Cell Cycle: Molecular events during interphase, genetic regulation of cell cycle.(including yeast as model system) Cellular transformation and malignancy:. Nuclear cytoplasmic interaction. Cell and tissue culture: cell and tissue culture in plants and animals, primary culture and cell line, cell clones, callus culture, soma clonal variation.

Unit-III

Molecular Biology The central dogma of Molecular Biology. DNA: Structure and confirmation, supercoiling, packing of DNA into chromosomes, structural polymorphism of DNA & RNA. Three dimensional structure of Trna. DNA as genetic material. Molecular mechanism of DNA replication. Genetic code. Detailed molecular account of transcription and translation in prokaryotes and eukaryotes. RNA processing. Capping, polydenylation, splicing introns, exons, mutations & DNA repair system, retroviruses and cancer (oncogenes).

Unit-IV

Biotechnology General steps of gene cloning-cutting, legation, transformation and analysis of clones, genomic & C- DNA library. Introduction to recombinant DNA technology enzymes, used in plasmids, vectors, blotting techniques, base- sequencing, polymerase chain reaction. Gene therapy, DNA finger printing, transgenic animals and plant. Potential hazards of recombinant DNA technology. Application of recombinants DNA technology in biological science.

Unit- V

Instrumentation Basic knowledge of the principles and application of microscopy:light, phase contrast, . Scanning and transmission electron microscopy. Colorimetry, colorymeter, spectrophotometer, centrifugation, types of rotors. Clinical, high- speed and ultracentrifuges. Preparative, differential & density gradient centrifugation. Chromatography: paper, thin layer chromatography, column-ion exchange, gel filtration, GLC. Electrophoresis: agarose, polyacrylamide, iso-electrefocussing, two- dimensional gel eletrophoresis.

PAPER V : GENETICS, EVOLUTION AND SYSTEMATICS

UNIT – I

Principles of Inheritance : Mendelian laws along with molecular explanations. Exceptions to Medelian Laws, Lethal alleles.Multiple alleles. Gene interactions (Modification of D1hybrid Ratios) and their biochemical basis. Miotic and meiotic cell division . Sturctural and numerical changes in chromosomes and the meiotic consequences of their heterozygotes Structure of chromatin (histones, DNA, nucleosome) and its organization into metaphase chromosome. Higher organization of chromosome (telomere, centromete, kinetochore, chromosome banding heterochromatin) Giant chromosomes : Polytene and Lampbrush chromosomes.

UNIT – II

Pedigree analysis in man. Sex linked inheritance and genetic disorders. Cytoplasmic inheritance Extrachromosoma inheritance (episomes, mitochondria and chloroplasts). Gene concept : Sturcture, function and regulation, Linkage, genetic mapping techniques (Three point test cross) gene mapping in man (Somatic cell hybridization technique). Gene maps in some organisms. Fine structure of gene Molecular structure of prokaryotic and eukaryotic gene Operon hypothesis, positive & negative control of lac operon, inducible and repressible operons. Regulation of gene expression in eukaryotes. Population genetics : In-breeding, allele frequency determination. Hardy-Weinberg law & its applications. Chromosomal &DNA polymorphism. Mutation.

UNIT – III

An overview of the concepts of organic evolution and evolutionary theories Origin of life (including aspects of prebiotic environment and molecular evolution); Variations Natural selection : Concept; Types of selection and selection coefficient Molecular basis of mutations and their role in evolution Speciation : isolating mechanisms; Modes of speciation (allopatric, sympatric, parapatric). Micro and macroevolution.

UNIT – IV

Animal distribution : Types of distribution; Means |& Barriers to distribution Zoogeographical divisions of the world (characteristics & fauna). Insular fauna. Palaeontology: Fossils of animal Evolution of Horse and Man Extinctions

UNIT – V

History of animal taxonomy Introduction and scope of Systematics Species concepts (Typological nominalistic, Biological and Evolutionary) Principal of Classification, functions, systems of classification Linnean hierarchy. Nomenclature : ICZN; Taxon, Rank and categories Conventional and modern methodologies in taxonomy. Preparation of keys, Techniques of museum preparation.

PAPER VI: ECOLOGY AND WILDLIFE

UNIT-I

Ecological Principles and Concepts: Environmental factors: Abiotic and Biotic factors Limiting Factors: Liebig's law of minimum. Shelford's law of tolerance. Combined concept of limiting factor. Factor interaction. Homeostasis. Ecosystem. Concept: Energy flow: Productivity: Food chains and Ecological pyramids. Biogeochemical cycle: Concept and Types of biogeochemical cycle (nitrogen, phosphorus, carbon, sulphur and water cycle).

UNIT-II

Community: Concept and characteristics: Density, Dominance, Diversity and Stratification. Ecotones and Edge effect. Succession of communities; Key stone species. Population: Concept and attributes: Biotic potential, Density, Natality, Mortality, Intrinsic rate of natural increase, survivorship curves. Population growth forms; Carrying capacity; Population fluctuations and cyclic oscillations, population regulation (Density independent). Population structure as indicated by Age structure.

UNIT- III

Habitat Ecology: Concept of Habitats and ecological niche. Aquatic habitats: Characteristics and faunal adaptations of freshwater, marine and Estuarine. Introduction to major Biomes of the world. Concept of biodiversity: Endemism, Genetic, Species and ecosystems diversity; Factors influencing biodiversity. Environmental pollution (Air, water, solid waste, Radioactive): Environmental impact Assessment.

UNIT-IV

Techniques used in wildlife ecology: Identification by natural marking.pug marks, calls, behavioural idiosyncrasies etc. Passive marking (collars,Tags, Branding, Rings etc). Dynamic marking (radiotelemetry, satellite telemetry, radioisotopic tracers). Population estimation techniques: Absolute versus relative density, total count versus estimates. Census methods (Drive count, aerial count, point count). Sampling estimates (catch effort, quadrates removal, transects) Indices (pug marks, droppings, nests, burrows, dens, calls)

UNIT-V

Introduction to physiography of Indian mainland: Latitudinal and longitudinal extent, topography, Climate and seasons. Biogeography of India: Patterns of distribution of biota Wildlife conservation and Management: Managing the people, General introduction to Sanctuaries, National parks and Biosphere reserves in India. Role of Zoos. Captive breeding and game farming. Conservation of germ plasma (frozen zoo). Endangered species: IUCN categories for conservation. Endangered fauna of Himalaya (distribution, habitat, habitats).

Syllabus of M.Sc. (Zoology)-2nd Year

PAPER-I BIOCHEMISTRY AND PHYSIOLOGY

UNIT-I

Structure, classification and biological significance of carbohydrates. Metabolism of carbohydrates & formation of ATP: Release of energy from food. Transport of glucose (blood glucose level). Phosphorylation to glucose storage of glucose in liver & muscles (glycogenesis, glycogenolysis). Release of energy from glucose molecule (glycolysis, citric acid cycle, control of glycolysis through enzymes & products) Anaerobic glycolysis.

UNIT—II

Structure & biological significance of glycoproteins & proteoglycans. Alternate pathways (pentose phosphate pathway) > Elementary Knowledge of formation of carbohydrate from protein & fat (gluconeogenesis). Structure, classification and biological significance of lipids. Elementary Knowledge of oxidation of fatty acids, biosynthesis of fatty acids, triglycerides and phospholipids. Introduction to cholesterol synthesis, its control, transport and utilization.

UNIT-III

Amino acids: classification, structure & nomenclature Metabolism of amino acids: outline of biosynthesis. Proteins: covalent backbone of proteins, amino acid sequence determination. Conformation of proteins and polypeptides; secondary, tertiary, Quaternary and domain structure Ramachandran Plot Enzyme classification nomenclature properties as active sites, mechanism of action. Enzyme kinetics, Michaelis-Menten equation, Lineweaver Burk plot. Factors affecting enzyme activity/initial velocity. Regulation of enzyme activity. Inhibition of enzyme. Coenzymes.

UNIT-IV

The internal environment: Homeostasis nervous & hormonal control. Extracellular and intracellular fluids. Active transport across membranes. Physiology of nutrition digestion & absorption: Secretion of the gastrointestinal tract. Digestion and absorption of proteins, fats and carbohydrates. Physiology of respiration. Exchange of respiratory gases at the pulmonary surface. Transport of respiratory gases by blood. Factors affecting combination of oxygen with haemoglobin. Physiology of excretion. Formation of urine: Glomerular filtration and its control reabsorption & secretions in the tubules Mechanisms of active transport Excretion and control of urea, sodium, potassium and other ions. Formation of hyperosmotic urine (counter current mechanism) Physiology of cardiovascular system: Initiation, conduction and regulation of heart beat, Cardiac cycle Circulation (open and closed blood composition and function) Blood Groups Fundamentals of Osmoregulatory mechanisms.

UNIT V

Nervous system Functional differentiation of brain and hierarchy of control: Neuron The basic functional unit the sensory and motor division Ionic basis of resting and action potentials of neurons, significance of myelinated nerves fibre velocity of conduction. Mechanism of synaptic transmission, transmitters (acetylcholine, norepinephrine, histamine. Visual adaptation in vertebrates. Muscle contraction: Structural proteins of muscle cells, actin myosin complex and source for contraction Sliding filament theory of muscle contraction.

Thermoregulation: Dormancy in terrestrial animals Desert adaptation Bioluminescence in insects (light producing organs, mechanism of light production control of light production, significance of light production)

PAPER-II CHORDATA

UNIT-I

Structure & development of urochordata & cephalochordata. Affinities of hemichordata, Urochordata, Cephalochordata.

UNIT-II

Characters & affinities of cyclostomata. Salient features of different groups of fishes: comparison between chondrichthyes & osteichthyes: Dipnoi.

UNIT-III

Origin & evolution of Amphibia. Parental care in Amphibia. Origin of Reptilia & adaptive radiation in Reptilia. Characters & affinities of chelonians & Rhynchocephalia.

UNIT-IV

Origin & ancestry of birds, Characters and affinities of Ratitae. Origin & mechanism of flight in birds. Migration in birds.

UNIT-V

Origin of mammals. Characters & affinities of Prototheria and metatheria. Dentition in mammals. Aquatic & flying adaptations in mammals. Adaptive radiation in mammals.

PAPER-III DEVELOPMENTAL BIOLOGY, TOXICOLOGY, BIOSTATICS AND COMPUTER APPLICATION

UNIT I

Gametogenesis in animals: Development and differentiation of sperm and oocytes, capacitation, vitellogenesis. Mechanism of fertilization (morphological and molecular aspects): acrosomal reaction, cortical reaction and fertilization membrane; blocks of polyspermy; parthenogenesis; morphogenetic cellular movement.

UNIT II

Cellular differentiation: Mechanism of Cellular differentiation (transcriptional regulation of gene expression, differential RNA processing and translation). Concept of organizer and embryonic inductions: primary, secondary & tertiary cellular interactions. Eye morphogenesis. Development in Drosophila: egg, cleavage, gastrulation; molecular basis of development, maternal effect genes, segmentation gene and homeotic selector genes.

UNIT III

Metaplasia and trans differentiation, lymphocyte differentiation and genomic alteration. Ageing theories: cellular and genetic basis. Limb morphogenesis. Regeneration. Teratogens. Metamorphosis : Insect metamorphosis (hemimetabolous, holometabolous); Amphibian metamorphosis (morphological & biochemical changes).

UNIT-IV

Introduction of toxicology. Kinds and classification of toxic substances: Pesticides, Heavy metals, Industrial chemicals & Radioactive substances. Exposure to toxicants : Routes & sites of exposure (inhalation, injection and through food or intestinal). duration & frequency of exposure: acute, subacute, chronic & subchronic. Dose-response relationship: measurement of dose-response relationship & dose- response curve. Chemical nature of toxicants: pesticides, radioactive compound & heavy metals. Mechanism of action: receptors (proteins), mechanism of action of DDT, lead (pb) & UV rays. Bioaccumulation of xenobiotics and process of elimination of xenobiotics.

UNIT –V

Biostatistics: importance of statistics in biological research. Calculation of mean, median, mode, range, variance, standard deviation. Concept of co-efficient of variation, skewness & kurtosis. Simple correlation and linear regression (scatter diagram, regression coefficients, regression lines). Elementary idea of random variables. Introduction to some distributions of random variables: binomial, poisson, normal; student-t, chi-square and F-test of significance. Introduction to statistical softwares. Introduction to computers: Mini, micro, mainframe and super computers; Components of a computer system (CPU, I/O units). Data storage device, memory concept. Software and types of software. Computer applications in biology and information communications (databases, e-mail and local networks).

Special paper: Fish and Fisheries -Aquaculture & Fisheries Science

UNIT-I

History of aquaculture, scope importance. Cultivable fishes and classification of culture practices. Concept of fish farm, principles of site selection. Fertilizers and their role. Transportation of brood fish and fish seed. Induced breeding and fish culture. Composite fish culture. Different hatching techniques, nursery, rearing and stocking ponds. Physio-chemical and biological characteristic of fish ponds. Management in fish farming (Brood stock management, fish seed, its sources, plankton feed, algal bloom, weed eradication, natural food.) Supplementary feeding and artificial food. Culture of common carp. Trout culture. Cold water fisheries. Sewage-fed fisheries. Brackishwater fish culture. Sea farming. Paddy-cum-fish culture. Cage culture. Prawn culture in India. Common disease of IMC and prawn, their control and cure.

UNIT –II

Nutritional value of fish. Technology of fish preservation and processing. Fish by- products (Body oil, liver oil, meal flour, fish manure and guano, sausage and ham, fish glue, Isinglass, fish leather, fish caviar, fish macaroni, biscuits and insulin). Transportation of table fish from landing sites. Fish spoilage. Preservation and processing of fishes. Fish marketing, recreational fishery, co- operative movements. Fisheries extension education and training in India. Larvivorous fish, mosquito control.

UNIT-III

Ornamental organism: fish, anemones lobsters, octopus, starfish, major fresh water ornamental fishes, speceies their taxonomy and biology. Secondary sexual characters, breeding habits, parental care, larval nutritional requirement, feed and feeding. Induced breeding of ornamental fish, monosex, use of pigmentation in colour selection. Health management, marine ornamental fish, common diseases of aquarium fishes, diagnosis, treatment.

Aquarium: setting up of aquarium, material and process. Water requirements, tempereture control. Water quality, selection of species, maintenance.

UNIT-IV

Inland capture Fisheries of India: Riverine Fisheries, Lacustrine and reservoir fisheries, Capture fisheries: wold scenario, present yield. Molluscan fisheries, Development of fishery in dams. Estuarine fisheries, Cold water fisheries. Ecology of fresh water lotic and lentic bodies hillstream. Ecology of Estuaries and sea. Fishing gears used in inland fisheries(traditional and illegal methods). Marine capture fishery of India: Coastal fisheries, Off-shore and deep sea fisheries, principal capture fisheries of India, Hilsa, oil sardine, mackerel, Bombay duck, sole, ribbon, shark and ray fisheries. Fishing gears, conventional and unconventional fishing methods used in marine fishery. Exclusive econothic zone.

UNIT-V

Fish fauna of important river and hillstreams Garhwal. Adaptation of hillstream fishes. Fishery biology of Indian major carps, mahseer and snow trout: morphometrics, length-weight relationship, relative condition factor, bariis. Maturation(size at first maturity), spawning season & frequency(macroscopic & microscopic studies). Fecundity(absolute, relative). Gonadosomatic index. Natural breeding and ecology of Mahseer and snow trout. Diet feeding habit and preferences of hill stream fishes (Gastro-somatic index, strauss index, relative length of gut and feeding indices).

Age, growth rate (back calculation and length-frequency method), harvestable size of fish, with special reference to IMC, mahseer and snow trout. Population dynamics, conventional methods and softwares: maximum sustainable yield, growth parameters (K , L_{∞}), Mortality (natural, fishing, total) Rate of exploitation (E).

SPECIAL PAPER: FISH & FISHERIES
PAPER X A : FISH BIOLOGY

UNIT –I

Fish systematic and phylogeny; Schemes of classification of recent and fossil fishes. Origin, evolution and phylogeny of fishes. Fossil fishes: Ostracoderms, Placoderms and their affinities. Adaptive radiations in different groups of fishes: Holocephali, Dipnoi, Cyclostomata and their affinities.

UNIT-II

Morphology: Comparative morphology of integument Scales: Kinds, development, modifications and uses Skeletal system. Alimentary tract: Modification in alimentary canal. History of gut. Digestive glands: Heart & arrangement of blood vessels Structure of respiratory organs including accessory respiratory organs. Excretory system. Reproductive system; Nervous system. Structural variations in air bladder Receptor organ. Eye, Acoustico- Lateralis system. Olfactory organs, Taste buds.

UNIT-III

Fish Physiology: Physiology of respiration : functional organization of gill lamellae , mechanism of gas exchange. Countercurrent principle of oxygen uptake,(nervous and hormonal) control of blood flow in gill lamellae. Physiology of haemopoiesis : Haemopoietic tissue synthesis of haemoglobin, Hormonal control of haemopoiesis. Mechanism of excretion and osmoregulation : Mechanism of water-salt balance in freshwater, marine estuarine & migratory fishes. Mechanism of electricity generation Luminiscence and control of photophores.

UNIT IV

Endocrine physiology: Microanatomy of pituitary gland of teleost Hormones of pituitary and their physiological actions. The thyroid gland & function of thyroid hormones in fish Pancreatic endocrine secretion in teleosts. Hormonal steroids, their source & biosynthesis in fish Brief introduction to the corpuscles of stannous

UNIT V

Embryology & Fish Behaviour : Avoidance & Aggressive behavior Reproductive strategies in fish Olfaction and its role in feeding & feeding & reproductive behavior Role of pheromones in sexual behavior of fish (steroids conjugates) Development of a teleost fish (egg , cleavage blastulation, gastrulation fate map) hatching and post embryonic development Viviparity in fish.