STATE COUNCIL OF EDUCATIONAL RESEARCH AND TRAINING

TNCF 2017 - DRAFT SYLLABUS

Subject : Zoology (Long Version) **Class :** XI

TOPIC	CONTENT
Unit –1 : Animal Diversity	LIVING WORLD - Diversity in the Living World; Need for classification; Five kingdom Classification; Three domains of life; Taxonomy and Systematics; Concept of species and taxonomical hierarchy; Binomial and trinomial nomenclature; Tools for study of Taxonomy: Key, Museums, Zoo. KINGDOM ANIMALIA - Basis of classification; Levels of organisation: asymmetry, symmetry, Radial symmetry, and Bilateral symmetry; Diploblastic and triploblastic organisation (Brief account giving one example for each type from the representative phyla); Acoelomates, Pseudocoelomates and Eucoelomates - Schizo and Entero coelomates; Segmentation and notochord; Salient features and classification of animals: Non-Chordates (Invertebrates) up to phyla level and Chordates up to class level (five salient features and at least two examples of each category).
Unit – 2 : Structural Organisation In Animals	ANIMAL TISSUES - Animal Tissues; Epithelial tissues-simple and compound epithelium; Connective tissue-Loose and dense connective tissue; Muscle tissue-skeletal muscle, smooth muscle, cardiac muscle; Neural tissue

	ORGAN AND ORGAN SYSTEM IN ANIMALS – Morphology; Anatomy and functions of different systems (digestive, respiratory, circulatory, nervous and reproductive) of Earthworm, Cockroach, Frog and Pigeon
Unit –3 : Human Anatomy And Physiology (I)	DIGESTION AND ABSORPTION - Digestive system; Alimentary canal; histology of human gut and digestive glands; salivary glands, gastric glands, liver and pancreas; Digestion of food; Role of digestive enzymes and gastrointestinal hormones; absorption and assimilation of proteins, carbohydrates and fats; Egestion; Caloric value of carbohydrates, proteins and fats; Nutritional and digestive disorders – Protein Energy Malnutrition, indigestion, constipation, vomiting, jaundice, diarrhoea, peptic ulcer; Appendicitis, Gallstone, Hiatushernia. RESPIRATION - Respiratory organs in animals; Human respiratory system; Mechanism of breathing; Respiratory volumes and capacities; Exchange of gases; respiratory pigments- haemoglobin; methaemoglobin; transport of gases -O_2 and CO_2, Bohr effect, Haldane effect; Regulation of respiration; Disorders related to respiration-Asthma, Emphysema, TB, Pneumonia, bronchitis; Occupational respiratory disorders; Problems with O_2 transport BODY FLUIDS AND CIRCULATION -Composition of blood, coagulation of blood; Composition of lymph and its function; Structure of human heart and blood vessels-arteries and veins; coronary blood vessels; Cardiac cycle, cardiac output, Double circulation; Regulation of cardiac

	activity; Disorders of circulatory system- Hypertension, Coronary artery disease, Angina pectoris, Heart failure, Rheumatoid heart disease; Diagnosis and treatment – Electrocardiograph (ECG); Angiogram, bypass surgery, heart transplantation, CPR EXCRETION - Modes of excretion- Ammonotelism, ureotelism, uricotelism; Human excretory system, structure and functions of Kidney; Urine formation; Osmoregulation : Regulation of kidney function-Renin-angiotensin, Atrial Natriuretic Factor, ADH and Diabetes insipidus; Urinary tract infection – causes; Role of other organs in excretion; Disorders related to Excretory System: Uraemia, Renal failure, Renal calculi, Nephritis; Dialysis – types, Artificial kidney. Kidney transplantation.
Unit – 4 : Human Anatomy And Physiology (II)	LOCOMOTION AND MOVEMENT - Types of movement- amoeboid, ciliary, flagellar, muscular; Muscle – types, structure, distribution; Skeletal muscle- ultrastructure ; structure of contractile proteins and mechanism of muscle contraction; types of muscle contractions – isotonic , isometric; Properties of skeletal muscle – excitability , contractibility and conductibility , threshold, fatigue , pull, tetany , atrophy, rigor mortis; Skeletal system and its functions; Axial skeleton, appendicular skeleton; Joints- types; Disorders of muscular and skeletal system-Myasthenia gravis, Tetany, Muscular dystrophy, Arthritis – types , Osteoporosis, Gout, rickets , osteomalacia; Bone fracture-mechanism and healing ; dislocation of joints and treatment-Knee Replacement, physiotherapy

	NEURAL CONTROL AND COORDINATION - Neural System - Human neural system-Neuron as structural and functional unit of neural system; Generation and conduction of nerve impulse; synaptic transmission of impulses; Central neural system- human brain; Reflex action and reflex arc; Sensory reception and processing; Eye, Ear, Olfactory and gustatory receptors. CHEMICAL COORDINATION AND INTEGRATION - Introduction – Endocrine glands and hormones; Human endocrine system-Hypothalamus, Pituitary, Pineal, Thyroid, Parathyroid, Adrenal, Pancreas, Gonads; Hypo- and hyperactivity and related disorders (Common disorders e.g. Dwarfism, Acromegaly, Cretinism, goiter, exopthalmicgoiter, diabetes, Addison's disease etc,); Mechanism of hormone action; Role of hormones as messengers and regulators, Hormones of heart, kidney and Gastro intestinal tract Chapter – XII: BASIC MEDICAL INSTRUMENTS AND TECHNIQUES - Medical Instruments- Stethoscope, Sphygmomanometer, haemocytometer, Glucometer, autoanalyser, ECG, EEG, Xrays, CT scan, MRI ; Techniques-blood cell counting using haemocytometer; Blood smear preparation and differential count
Unit – 5 : Animal Resources	TRENDS IN ECONOMIC ZOOLOGY - Scope of Zoology – Vermiculture - Sericulture- apiculture – Lac culture – Aquaponics - Aquaculture - Fishes- Prawn - Pearl culture - Animal Husbandry and management - Dairy farm - Poultry farm - Poultry (chicken, duck) - Animal Breeding.

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Subject : Zoology (Long Version) **Class :** XII

TOPIC	CONTENT
UNIT – 1 : Reproduction	REPRODUCTION IN ORGANISMS - Reproduction in organisms; Reproduction a characteristic features of all organisms, continuation of species; Modes of reproduction: Asexual and sexual; Asexual reproduction; Modes of asexual reproduction; Binary and multiple fission; Sporulation; Budding, Gemmule, Fragmentation, Regeneration; Modes of sexual reproduction: External and internal fertilization; Oviparous, Ovoviviparous and Viviparous. – examples HUMAN REPRODUCTION - Human reproductive system; Male and Female reproductive system; Structure of ovary, Structure of Spermatozoan; Gametogenesis, Spermatogenesis and oogenesis; Ovulation, fertilization; Menstrual cycle; Menstrual Disorders; Amenorrhoea; Oligomenorrhoea; Polymenorrhoea; Dysmenorrhoea- types

	primary and secondary; Menorrhagia; Menstrual Hygiene-Napkins, Tampons – Cervical Cancer; Fertilization and Implantation; Maintenance of Pregnancy-Pregnancy and Embryonic Development, Hormones produced from the placenta during pregnancy; Embryonic cell's layers and organs development; Embryonic development at various months of pregnancy in human; Ectopic Pregnancy; Parturition and lactation; Hormones in parturition and lactation Colostrum REPRODUCTIVE HEALTH - Reproductive Health; The strategies to be implemented to attain total reproductive health; Sex Determination- Gender detection in Pregnancy-Amniocentesis - Statutory ban on amniocentesis-Ultra sound Scan – Social impact of sex ratio – Foeticide – infanticide; Population explosion and birth control; Control Measures- Statutory rising of marriageable age, incentives given to couple with small families and family planning programme; Contraceptive methods and mechanism of Action; Natural barriers; IUDs -Copper IUDs- Cu-7, CuT 380A, Multiload 375and Hormonal releasing IUDs- Progestasert, LNG 20); Oral Pills - Female contraceptive injections- Depot Medroxyprogesterone Acetate (DMPA), norethisteroneenanthate (NET-EN), combined progestin and estrogen monthly injections; Implants and surgical methods; Medical Termination of Pregnancy; The medical necessity and social consequences of MTP; Sexually Transmitted Diseases (STD); The major STDs and its symptoms- AIDS, Hepatitis, Gonorrhoea, Syphilis, Genital Herpes, Genital warts, Trichomoniasis, Chlamydiasis;

	Mode of Transmission and Preventive measures; Infertility; Assisted Reproductive Technologies (ART) -IVF-ET, ZIFT, GIFT, IUT, AI, ICSI; Surrogacy
Unit – 2 : Genetics And Evolution	PRINCIPLES OF INHERITANCE AND VARIATION - Multiple alleles - Human Blood Groups; ABO Blood groups inheritance; Genetic control of Rh factor; Erythroblastosis foetalis; Sex determination; Autosome, Allosome; Sex determination in Man, Insects and birds; Genic Balance theory; Barr bodies{x-inactivation}; Sex linked inheritance- X-linked inheritance; Haemophilia; Colour blindness; Y-linked- Hypertrichosis; Karyotyping, Pedigree analysis Mendelian Disorders; Thalassemia; Albinism; Phenylketonuria; SCID; Huntington's chorea; Chromosomal abnormalities- Down's syndrome; Klinefelter's Syndrome; Turner's Syndrome; Extrachromosomal inheritance- Kappa particles in Paramecium'; Shell coiling in snails; Animal brreding-

	inbreeding, outbreeding and heterosis; Eugenics, euphenics and euthenics MOLECULAR GENETICS - The DNA - Structure of Polynucleotide chain; Packing of DNA Helix; The search for genetic material; DNA is the genetic material; Properties of Genetic materials- Hershey and Chase Experiment; RNA world; Types of RNA- Role of RNA ; Replication; Enzymes for DNA replication; Mechanism of Replication; The experimental proof of DNA replication{Meselson and Stahl'sexperiment}; Transcription- Transcription unit; Transcription unit and gene; Process of Transcription; Genetic code; Salient features of Genetic code; Mutation and Genetic code; Translation; tRNA-The adapter molecule; Mechanism of Translation; Regulation of Gene expression; Lac operon; Human Genome project (HGP); Goals, methodologies of HGP; Salient feature of HGP; Applications and future challenges; Blotting techniques; Southern blotting; Northern Blotting; Western Blotting; Polymerase chain reaction(PCR); DNA finger printing technique. EVOLUTION - Origin of life; Theory of Spontaneous generation; Big bang theory; Theory of Biogenesis Evolution of life form; Evidences for evolution (Paleontology, comparative anatomy, embryology, molecular evidences); Evolution by anthropogenic action by natural / artificial selection-examples; Adaptive radiation- Darwins finches; Australian marsupials- Biological evolution; Theories of Evolution- Lamarck's theory, Darwins theory; Mechanism of evolution; Hardy

	Weinberg principle; Geological time scale; Origin and evolution of man; Isolating mechanism- prezygotic and postzygotic isolating mechanisms and Speciation- allopatric and sympatric speciation; Extinction of animals with reference to climate change, competition, habitat loss and killing by human - Dodo
UNIT – 3 : Biology and Human Welfare	HUMAN HEALTH AND DISEASES - Common diseases in man; Infectious and non infectious diseases; Common diseases in Man-typhoid, Pneumonia, Common cold, ringworm infection; Human diseases caused by protozoans- malaria, amoebiasis; Human diseases caused by helminthes- Ascariasis, filariasis; Maintenance of personal and public hygiene; Adolescence and Drug / Alcohol abuse –Addiction and Dependence- Effects of drug-Drug / Alcohol abuse-Prevention and Control-Alcohol abuse- Depression – Mental Health; Lifestyle disorders in Man. MICROBES IN HUMAN WELFARE = Role of microbes in household products; Microbes in Industrial products-Antibiotics; production, judicious use and antibiotic resistance; fermented beverages, chemicals, enzymes and bioactive molecules; Microbes in Sewage treatment and Energy generation –biogas production; Microbes as biocontrol agents and biofertilizers; Bioremediation IMMUNITY - Basic concepts of immunology- Innate immunity. Acquired immunity, -primary and secondary immune response; cells and organs of the immune system; Antigens, Structure of antibody. Antigen antibody interactions; Active and passive immunity– Vaccines –

	types; vaccination and Immunisation; Allergies; Autoimmunity: Auto immune diseases; Cancer and AIDS
Unit – 4 :Animal Biotechnology And Its Applications	PRINCIPLES OF BIOTECHNOLOGY - Principles of biotechnology; Tools of Recombinant DNA ; Technology; Molecular scissors – Restriction enzymes; DNA Ligase; Separation and isolation of DNA fragments- cloning vectors-salient features; Competent Host; Processes of DNA technology, Obtaining the foreign gene product Down streaming process APPLICATIONS OF BIOTECHNOLOGY –Introduction; Biotechnological application in Medicine ,Human insulin, Humal alpha Lactalbumin, Human growth hormone; Human blood clotting factors in treating haemophilia; Interferons; Vaccines; Gene therapy; Molecular diagnosis- ELISA (Enzyme Linked Immune- Sorbent Assay); PCR (Polymerase Chain Reaction); Stem Cell therapy, Stem Cell Banks; Bone Marrow Therapy; Animal cloning- Dolly; Transgenic Animals, Biological products(Rosie-Cow) and their uses; Regulation in biotechnology- bio safety, Possible dangers of GEOs, Biohazards of rDNA technology, Biosafety guidelines, Intellectual property Rights (IPR), Patenting of biotechnological products, copyright, Trademarks
Unit – V: Ecology, Environment And Conservation	ORGANISMS AND POPULATION - Concept of Ecology; Environment - habitat and Niche; Major abiotic factors , water, light, temperature & soil; Responses to abiotic factors; Population and ecological Adaptations; Interactions –Commensalism mutualism, competition, predation & parasitism; Population attributes – growth,

	birth rate & death rate, age distribution; Population growth curve; population regulations BIODIVERSITY AND ITS CONSERVATION - Biodiversity – concepts of biodiversity; levels of Biodiversity; Patterns of Biodiversity; Importance of random sampling in determining the biodiversity of an area; Biogeographical regions of India; Biotic provinces of Tamil Nadu; Importance of biodiversity – global and India; Loss of biodiversity; Threats to biodiversity; Biodiversity conservation – IUCN; Hotspots / Endangered organisms; extinction, red data book; Role of WWF and the Convention on International Trade in Endangered Species of Wild Fauna (CITES) in local and global conservation(Restoration of degraded habitats with an example); Causes of biodiversity Losses; BDA ENVIRONMENTAL ISSUES - Air pollution and its control; Water pollution and its control; Noise pollution; Agrochemicals and their effects – biomagnifications, Eutrophication; Organic farming & its implementation; Solid waste management / radioactive waste management; green house effect & global warming; Impact on Marine Ecosystem; ozone depletion; deforestation; e- waste; Remedy of plastic waste ; Eco-San toilets; People participation in conservation of forest; Climate change – Conventions on climate change; Carbon credit, Carbon trading; CCS: Carbon Captures storage; Carbon sequestration