



Central University of Himachal Pradesh

(Established under Central Universities Act 2009)

PO BOX: 21, DHARAMSHALA, DISTRICT KANGRA – 176215, HIMACHAL
PRADESH

www.cuhimachal.ac.in

SEMESTER- IV

Course Code: ZOOL 504

Credit: 04

Course Name: Genetics and Cytogenetics

Course Contents:

UNIT-I

Mendelian principles and its modifications and inheritance patterns:

Principle of paired factor, principle of dominance, principle of segregation, principle of independent assortment, intragenic and intergenic interactions, maternal effect, epigenetic inheritance, mitochondrial and chloroplast inheritance

UNIT-II

Genome structure, nucleosome model and description of gene expression

DNA, RNA structure, types and function, chromosome structure, giant chromosomes, euchromatin and heterochromatin, banding pattern and chromosome condensation.

DNA Replication, transcription, translation mechanism and regulation of gene expression

UNIT-III

Variation in chromosome number and structure and gene mutation and DNA repair

Euploidy, aneuploidy, deletion, inversion, duplication, translocation, gene Mutation types and causes and mismatch repair, base excision repair, nucleotide excision repair and photoreactivation repair

UNIT-IV

Quantitative, Population and Human Genetics

Quantitative traits, Polygenic inheritance and heritability

Genes in population, the Hardy-Weinberg equilibrium and factor that changes allele frequency in population

Human chromosome karyotypes, pedigree analysis, chromosomal abnormalities, sex determination and sex linked genetic disorder

UNIT-V

Genome mapping and Recombination

Cytogenetic mapping, mapping using molecular markers and physical mapping

Sister chromatid exchanges and homologous recombination, site specific and recombination



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SEMESTER- IV

Course Code: ZOOL 508

Credit: 04

Course Name: Animal Physiology

Course Contents:

Unit - I Nutrition and digestion

Modes of animal nutrition, Digestion and its control , Salivary digestion , Gastric digestion
Intestinal digestion and digestion enzymes, Digestion and absorption of proteins, fats and
carbohydrates, Vitamins, minerals and their role, Coordination and control of digestion.

Unit - II Blood

Composition and Functions , Blood coagulation, Blood groups and transfusion, Buffer system,
Heart and its working, Heart Beats (in mammals), Origin, rhythmicity and conduction, Nervous
regulation, Chemical regulation, Electro-cardiogram, Cardiac cycle in man, The exchange
vessels, Different types of body fluids, their importance and regulation

Unit - III Respiratory Physiology

Transport of O₂ and CO₂, Distribution and physiology of respiratory pigments, Carbon
monoxide poisoning , Respiratory regulation of acid base balance, Respiratory Quotient.

Unit - IV Excretory and Neurophysiology

Excretory physiology (in mammals), Detailed structure of nephron, Ultrafiltration, absorption
and secretion mechanisms in urine formation Glomerular functions, Tubular functions, The
rennin angiotensins, Aldosterone system

Neurophysiology- Nerve cell organization, Nerve impulse origin and propagation, Synapsis and transmitters.

Unit – V Structural basis of contraction

Ultrastructure of a skeletal muscle, Differences between skeletal, cardio and smooth muscle, Mechanism of contraction of skeletal muscle, Sliding, filament theory and cross bridge activity, Cross-bridge attachment and muscle contraction, Energy cycle, role of ATP and phosphogen

Recommended Books:

1. Rugg, J.C., Calcium in muscle activation, Springer Verlag Berlin Heidelberg, New York.
2. Hoar, W.S. General and comparative physiology, Prentice, Hall Inc./England Wood cliffs, New Jersey.
3. Guyton, A.C. and Hall, J.E.; Text book of medical physiology, 10th Ed, Saunders, Harcourt, India.
4. Heilmeyer, L.M.G. Cellular regulation of protein phosphorylation, springer-verlag, Berlin Heidelberg, New York.
5. Prosser, C.L. and Brown, F.A. comparative Animal Physiology 2nd Ed. W.B. Saunders, Philadelplina.
6. Karpati, G., Jones, D.H. and Griggs. R.C. Disorders of Voluntary Muscle, 7th Edn, Cambridge University Press.
7. Turner, C.D. General Endocrinology, 4th Ed. W.B. Saunders, Philadelphia London.
8. Prosser, C.L., Comparative Animal Physiology, W.B. Saunders, Toppen Publication.



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SEMESTER- IV

Course Code: ZOOL 504

Credit: 02

Course Name: Medical Entomology

Course Contents:

UNIT-I

Phyletic study: classification of medically important organisms, existing public health problems

Human endoparasites: ascaris, liver fluke, tapeworm, hook worm their life history

UNIT-II

Vectors of medical importance, their life cycle, epidemiology and management: houseflies, sandflies, human lice of different types, flea and reduvid bugs

UNIT-III

Vectors from class arachnida, crustacean ticks, mites, cyclops, their life cycle and control

Vector borne diseases spread through mosquitoes: malaria, filaria, viral encephalitis, viral fever, dengue yellow fever

UNIT-IV

Vector borne diseases spread through houseflies: typhoid, paratyphoid, dysentery, diarrhoea, cholera, amoebiasis, diseases spread through sand fly- kala azar, oriental sore, tsetse fly-sleeping sickness

Vector borne diseases spread through louse: typhus relapsing fever, trench fever, rat flea-bubonic plague and endemic typhus and diseases spread through ticks, mites and cyclops

UNIT-V

Vector control, insecticides, use and consequences and use of biocontrolling agents



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SEMESTER- IV

Course Code: ZOOL 529

Credit: 02

Course Name: Parasitology

Course Contents:

Unit I

Introduction to parasitology, host-parasite relationship.

Unit II

Classification, morphology, mode of infection and life cycle of protozoans: *Trypanosoma* sp., *Leishmania* sp. and *Plasmodium* sp., *Giardia* sp., *Trichomonas* sp., pathogenicity and prevention measures.

Unit III

Classification, morphology, mode of infection and life cycle of trematodes: *Fasciola* sp., *Schistosoma* sp., *Clonorchis* sp., *paragonimus* sp., pathogenicity and prevention measures.

Unit IV

Classification, morphology, mode of infection and life cycle of cestodes: *Taenia* sp., *Echinococcus* sp. and *Hymenolepis* sp., *Diphyllobothrium* sp. pathogenicity and prevention measures.

Unit V

Classification, morphology, mode of infection and life cycle of nematodes: *Ascaris* sp., *Ancylostoma* sp., *Wuchereria* sp. and *Dranunculus* sp., pathogenicity and prevention measures.



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SEMESTER- IV

Course Code: ZOOL 565

Credit: 02

Course Name: Fish Diseases and Control

Unit – 1

Introduction to Fish Disease, Need for Healthy Fish, Factors Favouring Diseases, General Symptoms of diseases of fish, Tests for Healthy Fish, Modes of Infection, Water and Soil Quality Management.

Unit – II

Fish Diseases: Stress in aquaculture and its role in disease development. Infectious, Nutritional and Environmental Disease (*Causative agent, symptoms and Control*)

Infectious Diseases: Bacterial Diseases (Dropsy, Furunculosis, Tail Rot), Fungal Diseases (*Gill rot*), Viral Diseases (*IPN, IHN, VH, CCVD*), Protozoan Diseases (*Costiasis, Ichthyophthiriasis*),

Nutritional Diseases: Pin head, Lipoid Hepatic Degeneration, Avitaminosis, Cataract.

Environmental Diseases: Role of physical (injuries, health, cold) chemical (pH, salinity, toxins, ammonia, nitrogenous waste, endogenous chemicals and metabolites, free radicals, oxidants) soil and water parameters in fish health.

Unit – III

Disease Management Tools:

Immunostimulants, Probiotics, Bioremediators,

Enzymes, and Nutritional Supplements, Vaccines,

Use of Specific Pathogen Free (SPF) and Specific Pathogen Resistant Broodstock (SPR)

Unit –IV

Techniques in Aquatic Animal Health:

Gross Observations

Procedures for collection of diseased live and dead samples for analysis.

Preservation of tissue samples.

Record keeping in aquatic animal health management.

Unit V

Control of Fish Diseases and Parasites: Rules for using fish drugs, correct use of fish drug,

Preventive measures of Infectious Diseases

Preventive measures of Nutritional Diseases

Preventive measures of Environmental Diseases

(Therapeutic methods for treatment of fish, treatment by immersion, administration of drugs with food)



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SEMESTER- IV

Course Code: ZOOL 530

Credit: 02

Course Name: Applied Zoology

Course Contents:

UNIT- I Apiculture

Introduction, The honeybees, Life cycle and polymorphism, Apicultural practices: By products of beehive, apiculture and crop pollination; Beekeeping and pesticides; Enemies and diseases of honeybees. Beekeeping industry in India and its future.

UNIT- II Pisciculture

Introduction, scope & status, Types of culture – Traditional, Extensive, Semi- Intensive, Intensive and Super- intensive culture, composite fish culture, Fresh water & marine fisheries, induced breeding & its technique in pisciculture; Haps & ponds for fish culture and their management; Fish enemies and their control; fish diseases and their control.

UNIT- III Sericulture

Origin and history of Sericulture, Different types of silk and silkworms in India, rearing of silkworms, Topography and climate for mulberry cultivation, diseases of silkworm. Byproducts of sericulture, Non-mulberry sericulture-Tassar, Muga and Ericulture: Sericulture industry in India.

UNIT- IV Crop Pest, their Management and wildlife

Biology and control of following insect pests of agricultural importance: Termites, Rice weevils, castor hairy caterpillar, codling moth, mango mealy bug, Cotton white fly, citrus psylla and cabbage Caterpillar.

Objective of wild life conservation and conservation strategies; Extinction of wild species meaning and cause; Wild life protection in India and classification of threatened species, protected wild animals.

UNIT- V Medical Zoology

Biology and control of following medically important organisms. Trichomonas, Trichuris, Onchocerca, Cyclops, sarcoptes, Dermacentor, Phlebotomus, Glossina, Blowfly, Gadfly. Mode of transmission and brief epidemiology of some important diseases. Cholera, Typhus, small pox, plague, Malaria, Dengue fever, Filariasis & AIDS

Suggested Literature:

1. Jhingran, V.G. 1995. Fish and Fisheries of India, Hindustan Publ. Corp., New Delhi.
2. Lagler, K.F. Bardach, J.E. Miller, R.R. and Pasina, D.R. M. 1987. Invertebrate Zoology John Wiley and Sons, New York.
3. Deshmahar, R. F. 1992. Wild life biology. Wiley Eastern Publisher, New Delhi.
4. Sharma, V.B. 1995. Wildlife in India. Natraj Publisher, Dehradun.
5. Verma, L.R. 1990 Beekeeping in integrated mountain development. Oxford & IBH Publ. Co., New Delhi.
6. Stine, K.E and Brown, T. M. 1996. Principles of Toxicology. Lewis Publishers London.
7. Atwal, A. S. 2000, Essentials. Of beekeeping & Pollination. Kalyani Publ. New Delhi.
8. Hassal, A.K. 1990. The Biochemistry and uses of Pesticides EELBS Editions
9. Atwal, A.S. and Dhaliwal G.S. 1997. Agriculture pests of South Asia and their management. Kalyani Publishers New Delhi.
10. Aruga, H. 1998. Principles of Sericulture. Oxford & IBH Publishing Co. New Delhi.
11. Harper, Physiological Chemistry
12. Karpati, G. Jones. D.H. and Griggs, R. c. Disorders of voluntary muscle, 7th edition. Cambridge Univ. Press.