

B.Sc. ZOOLOGY SYLLABUS UNDER CBCS 2019-20

B.Sc. ZOOLOGY I YEAR
SEMESTER-I

CORE PAPER – I

ANIMAL DIVERSITY – INVERTEBRATES

Instructions: 4 hr per week

No. of period: 60

No. of credits: 4

UNIT – I:

(15 Periods)

1.1 Protozoa.

- 1.1.1 General characters and classification of Protozoa upto order levels with examples
- 1.1.2 Type study – *Elphidium*
- 1.1.3 Locomotion and Reproduction in Protozoa.
- 1.1.4 Epidemiology of Protozoan diseases - Amoebiasis; Giardiasis; Leishmaniasis and Malaria.

1.2 Porifera

- 1.2.1. General characters and classification of Porifera upto order levels with examples
- 1.2.2 Type study – *Sycon*
- 1.2.3 Canal system in sponges and Spicules.

UNIT – II:

(15 Periods)

2.1. Cnidaria

- 2.1.1 General characters and classification of Cnidaria upto order levels with examples
- 2.1.2 Type study - *Obelia*
- 2.1.3 Polymorphism in Siphonophora
- 2.1.4 Corals and coral reef formation

2.2 Platyhelminthes

- 2.2.1 General characters
- 2.2.2 Classification of Platyhelminthes up to classes with examples
- 2.2.3 Type study- *Schistosoma*

2.3 Nematelminthes

- 2.3.1 General characters
- 2.3.2 Classification of Nematelminthes up to classes with examples
- 2.3.3 Type study - *Dracunculus*
- 2.3.4 Parasitic Adaptations in Helminthes

UNIT – III:

(15 Periods)

3.1 Annelida

- 3.1.1 General characters
- 3.1.2 Classification of Annelida up to classes with examples
- 3.1.3 Type study - *Hirudinaria granulosa*.
- 3.1.4 Evolutionary significance of Coelome and Coelomoducts and metamerism

3.2 Arthropoda

- 3.2.1 General characters
- 3.2.2 Classification of Arthropoda up to classes with examples
- 3.2.3 Type study - Prawn
- 3.2.4 Crustacean larvae
- 3.2.5 Insect metamorphosis
- 3.2.6 *Peripatus* - Structure and affinities

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B.Sc. ZOOLOGY SYLLABUS UNDER CBCS 2019-20

UNIT – IV:

(15 Periods)

4.1 Mollusca

- 4.1.1 General characters
- 4.1.2 Classification of Mollusca up to classes with examples
- 4.1.3 Type study - *Pila*
- 4.1.4 Pearl formation
- 4.1.5 Torsion and detorsion in gastropods

4.2 Echinodermata

- 4.2.1 General characters
- 4.2.2 Classification of Echinodermata up to classes with examples
- 4.2.3 Water vascular system in star fish
- 4.2.4 Echinoderm larvae and their significance

Suggested Readings:

1. L.H. Hyman 'The Invertebrates' Vol I, II and V. – M.C. Graw Hill Company Ltd.
2. Kotpal, R.L. 1988 - 1992 Protozoa, Porifera, Coelenterata, Helminthes, Arthropoda, Mollusca, Echinodermata. Rastogi Publications, Meerut.
3. E.L. Jordan and P.S. Verma 'Invertebrate Zoology' S. Chand and Company.
4. R.D. Barnes 'Invertebrate Zoology' by: W.B. Saunders CO., 1986.
5. Barrington. E.J.W., 'Invertebrate structure and Function' by ELBS.
- 6 P.S. Dhami and J.K. Dhami. Invertebrate Zoology. S. Chand and Co. New Delhi.
7. Parker, T.J. and Haswell 'A text book of Zoology' by, W.A., Mac Millan Co. London.
8. Barnes, R.D. (1982). *Invertebrate Zoology*, V Edition"



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B.Sc. ZOOLOGY I YEAR
SEMESTER-II
CORE PAPER – II
ANIMAL DIVERSITY- VERTEBRATES

Instructions: 4 hr per week
No. of period: 60
No. of credits: 4

UNIT – I:

1.1 Hemichordata

(15 Periods)

- 1.1.1 General characters
- 1.1.2 Classification of Hemichordata up to classes with examples
- 1.1.3 *Balanoglossus* - Structure and affinities

1.2. Urochordata, Cephalochordata, Cyclostomata

- 1.2.1. Salient features of Urochordata
- 1.2.2. Retrogressive metamorphosis and its significance in Urochordata
- 1.2.3. Salient features and affinities of Cephalochordata
- 1.2.4. General characters of Cyclostomata
- 1.2.5. Comparison of the *Petromyzon* and *Myxine*
- 1.2.6. General characters and classification of Chordata upto orders with examples

UNIT – II:

2.1. Pisces

(15 Periods)

- 2.1.1. General characters of Fishes
- 2.1.2. Classification of fishes up to order level with examples
- 2.1.3. *Scoliodon* – Respiratory, Circulatory and Nervous system.
- 2.1.4. Types of Scales and types of Fins

2.2. Amphibia

- 2.2.1. General characters of Amphibians
- 2.2.2. Classification of Amphibians up to orders with examples.
- 2.2.3. *Rana tigrina* - Respiratory, Circulatory and Nervous system.
- 2.2.4. Parental care in amphibian; neoteny and paedogenesis.

UNIT – III :

3.1 Reptilia

(15 Periods)

- 3.1.1. General characters of Reptilia
- 3.1.2. Classification of Reptilia up to orders with examples
- 3.1.3. *Calotes* – Respiratory system, Circulatory and Nervous system.
- 3.1.4. Temporal fosse in reptiles and its evolutionary importance
- 3.1.5. Distinguished characters of Poisonous and Non poisonous snakes.

3.2. Aves

- 3.1.1. General characters of Aves
- 3.1.2. Classification of Aves up to orders with examples.
- 3.1.3. *Columba livia* -, Digestive system, Circulatory systems, Respiratory system and Nervous system.
- 3.1.4. Migration in Birds
- 3.1.5. Flight adaptation in Birds

B.Sc. ZOOLOGY SYLLABUS UNDER CBCS 2019-20

UNIT – IV :

(15 Periods)

4.1. Mammalia

- 4.1.1. General characters of Mammalia
- 4.1.2. Classification of Mammalia up to orders with examples
- 4.1.3. Rabbit – Digestive, Respiratory, Circulatory and Nervous system.
- 4.1.4. Dentition in mammals
- 4.1.5. Aquatic adaptations in Mammals.

Suggested Readings:

1. E.L.Jordan and P.S. Verma 'Chordate Zoology' - S. Chand Publications
2. Mohan P.Arora. 'Chordata – I, Himalaya Publishing House Pvt.Ltd.
3. Marshal, Parker and Haswell 'Text book of Vertebrates'. ELBS and McMillan, England.
4. Alfred Sherwood Romer. Thomas S. Pearson 'The Vertebrate Body, Sixth edition, CBS college Publishing, Saunders College Publishing
5. George C. Kent, Robert K. Carr. *Comparative Anatomy of the Vertebrates*, 9th ed. McGraw Hill.
6. Kenneth Kardong *Vertebrates: Comparative Anatomy, Function and Evolution*, 4th ed, 'McGraw Hill.
7. J.W. Young, *The Life of Vertebrates*, 3rd ed, Oxford University press.
8. Harvey Pough F, Christine M. Janis, B. Heiser, *Vertebrate Life*, Pearson. 6th ed, Pearson Education Inc.2002.

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B.Sc. ZOOLOGY SYLLABUS UNDER CBCS 2019-20

B.Sc. ZOOLOGY II YEAR

SEMESTER –III

CORE PAPER – III : ANIMAL PHYSIOLOGY AND ANIMAL BEHAVIOUR

Instructions : 4hr per week

No.of periods : 60

No.of credits : 4

Periods: 60

Max. Marks: 60

(15 Periods)

UNIT – I

1.1 DIGESTION

1.1.1. Digestion of Carbohydrates, Proteins, Lipids and Cellulose.

1.1.2 Absorption and Assimilation of digested food;

1.1.3 Role of Gastrointestinal hormones in digestion

1.1.4. Disorders of Alimentary Canal.

1.2 EXCRETION

1.2.1 Classification of Animals on the basis of excretory products- Ammonotelic, Uricotelic, Ureotelic

1.2.2 Structure and function of Nephron.

1.2.3 Urine formation, Counter current mechanism.

1.3 ENZYMES

1.3.1. Enzymes: Definition, Classification & nomenclature

1.3.2 , Inhibition and Regulation

(15 Periods)

UNIT-II

2.1 HOMEOSTASIS AND OSMOREGULATION

2.1.1 Concept of Homeostasis

2.1.2 Mechanism of Homeostasis

2.1.3. Water and ionic regulation by freshwater,

2.1.4. Brackish water and marine water animals

2.2 RESPIRATION

2.2.1 Definition of Respiration , Respiratory mechanisms , External, Internal and cellular Respiration

2.2.2 Respiratory Pigments; transport of oxygen, Oxygen dissociation curves. Bohr's effect. transport of CO₂, Chloride shift;

2.2.3 Regulation of respiration – nervous and chemical mechanism

2.3 CIRCULATION

2.3.1 Types of circulation - Open and Closed circulation

2.3.2 Structure of Mammalian Heart, Types of hearts – neurogenic and myogenic;

2.3.3 Heart function – Conduction and regulation of heart beat, Regulation of Heart rate

2.3.4 Tachycardia and Bradycardia: Blood Clotting mechanism

(15 periods)

UNIT – III

3.1. MUSCLE CONTRACTION

3.1.1 Types of Muscles

3.1.2 Ultra structure of skeletal muscle fibre

3.1.3 Sliding Filament theory, muscle contraction mechanism. Biochemical changes during muscle contraction.

3.1.4 Twitch tetanus summation, Treppe fatigue.

3.2. NERVE IMPULSE

3.2.1 Structure of Neuron

3.2.2 Resting potential, action potential and conduction of nerve impulse

3.2.3 Transmission of nerve impulse

3.2.4 Synapse, Synaptic transmission neurotransmitters EPSP, IPSP

3.3 ENDOCRINE SYSTEM

3.3.1 Endocrine glands - Structure, secretions and functions of Pituitary, Thyroid, Parathyroid, Adrenal gland and Pancreas

3.3.2 Hormone action and concept of Secondary messengers

3.3.3 Male and Female Hormones, Hormonal control of Menstrual cycle in human beings.
(15 periods)

UNIT – IV

4.1 Animal Behaviour

4.1.1 Types of Behaviour- and acquired Instinctive behavior

4.1.2 Behaviour taxes, Reflexes, Tropisms

4.2 Learning and memory

4.2.1 Types of learning, trial and error learning, Imprinting, habituation,

4.2.2 Conditioning: Classical conditioning, Instrumental conditioning examples of conditioning; Pavlov's experiment

4.3. Social behavior, Communication:

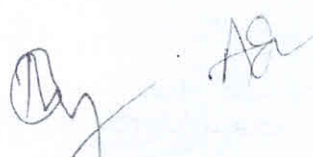
4.3.1 Colonial existence of bees and termites, Pheromones

4.4 Biological rhythms:

4.4.1 Biological clocks, Circadian rhythms, circumlunar rhythms, circannual rhythms

Suggested readings

1. Gerard J. Tortora and Sandra Reynolds Garbowski Principles of Anatomy and Physiology, Tenth Ed., John Wiley & Sons
2. Arthur C. Guyton MDA Text Book of Medical Physiology, Eleventh ed., John E. Hall, Harcourt Asia Ltd.
3. William F. Ganong A Review of Medical Physiology 22 ed, McGraw Hill, 2005
4. Sherwood, Klandrof, Yanc, Animal Physiology Thompson Brooks/Coole, 2005.
5. Sherwood, Klandrof, Yanc, Human Physiology. Thompson Brooks/Coole, 2005.
6. Knut Schmidt-Nielson, Animal Physiology 5th ed, Cambridge Low Price Edition.
7. Roger Eckert and Randal, Animal Physiology 4th ed, Freeman Co, New York
8. Singh. H.R, Text Book of Animal Physiology and Biochemistry
9. Nagabhushanam, Comparative Animal Physiology
10. Veer Bal Rastogi, Text Book of Animal Physiology



B.Sc. ZOOLOGY II Year
SEMESTER- III
PAPER-III (SEC - I): SERICULTURE

Instructions: 2hr per week

No. of period: 30

No. of credits: 2

UNIT- I:

(15 Periods)

- 1.1 History and economic importance of sericulture - types of silkworm - Mulberry and non-Mulberry (Tassar, Eri and Muga).
- 1.2 Systematic position of Bombyx and Life Cycle - Morphology of silk gland.
- 1.3 Horticulture - mulberry cultivation - Environmental conditions for mulberry cultivation - soil, climatic factors, preparation of land.
- 1.4 Intercultivation - pruning methods - harvesting
- 1.5 Diseases and pests of mulberry and control methods.

UNIT- II:

(15 Periods)

- 2.1 Silkworm rearing - general principles of silkworm rearing - primary requisite for successful rearing.
- 2.2 Feeding of silkworm, bed cleaning, sparring, moulting, late age silkworms - Moulting and harvesting economics of silkworm.
- 2.3 Diseases and pests of silkworm.
- 2.4 Reeling -reeling appliances and process of reeling cocoons.
- 2.5 Sericulture as cottage industry.

References:

1. Handbook of sericulture - S.R. Ullal and M. N. Varasimhanna
2. An introduction to sericulture - G. Ganga, J. Sulochana Chetty
3. Manual of Sericulture - FA O Volumes.
4. Handbook of Practical Sericulture : Ullal, S.R. and Narasimhanna, M.N. (1987). Central Silk Board Publication, Bangalore.
5. FAO Manuals on Sericulture : Anonymous (1972), Vol. I-IV
6. Sericulture for Rural Development : Hanumappa (1978), Himalaya Publication,
7. The Silkworm, an Important Laboratory Tool : Tazima, Y. (1978), Kodansha Publications, Tokyo.
8. Control of Silkworm Reproduction, Development and Sex : Strunnikov, V.A. (1983), MIR Publications, Moscow.
9. Ericulture in India Sarkar, D.C. (1988), CSB, Bangalore.
10. Silkworm Rearing : Wupang—Chun and Chen Da-Chung (1988), Pub. By FAO.
11. Handbook of Silkworm Rearing : Anonymous (1972), Agriculture and Technical Manual-1, Fuzi Pub. Co. Ltd., Tokyo, Japan.
12. Improved Method of Rearing Young age silkworm : Krishnaswamy (1986), CSB Publication, Bangalore.

GOVERNMENT DEGREE COLLEGE FOR WOMEN BEGUMPET, HYDERABAD.
(AUTONOMOUS)

SYLLABUS FOR B.Sc. ZOOLOGY COURSE (CBCS) 2020-21

Semester – III

Skill Enhancement Course-I

Paper – AQUACULTURE

MAX. MARKS: 50

PERIODS: 30

NO. OF CREDITS: 2

UNIT-I

15 periods

- 1.1 Introduction and types of fisheries
- 1.2 Fishery resources- fresh water, brackish water and marine water
- 1.3 Construction and Management of fish pond
- 1.4 Fishing crafts and fishing gears.
- 1.5 Hatchery design, water quality and management

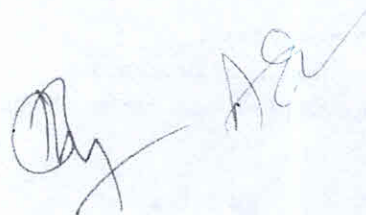
UNIT-II

15 periods

- 2.1. Induced breeding-importance of induced breeding
- 2.2 Seed production, Seed transport and Seed stocking
- 2.3 Fish products-primary and secondary products.
- 2.4 Common diseases - viruses, Bacteria and fungi.
- 2.5 Post harvest technology-preservation method of fishes

References

1. Ichthyology-SK Gupta and P C Gupta
2. An introduction to fishes - S S Khanna
3. Fish and fisheries –Pandey and Shukla



GOVERNMENT DEGREE COLLEGE FOR WOMEN BEGUMPET, HYDERABAD.

(AUTONOMOUS)

SYLLABUS FOR B.Sc. ZOOLOGY COURSE (CBCS) 2020-21

Semester – IV

Skill Enhancement Course-II

Paper – Vermiculture and Vermicomposting

MAX. MARKS: 50

PERIODS: 30

NO. OF CREDITS: 2

UNIT: I

(15 periods)

- 1.1 Scope of vermi-technology- Vermiculture and vermi composting – difference between vermiculture and vermi composting –
- 1.2 Earthworm diversity – Ecological groups of earthworms, biology of composting earthworms – *Eoisena foetida*, *Eudrilus lugeniae*.
- 1.3 Soil – Physical, chemical and biological features
- 1.4 Types small and large scale pit method, heap method.

UNIT: II

(15 periods)

- 2.1. Vermiculture techniques – vermi culture process – site selection - Selection and collection of species.
- 2.2. Essential parameters for vermi culture – bedding. Methods of harvesting worms general manual methods, self harvesting method, mechanical method
- 2.3. Nutritive value of vermi compost, storing and packing of compost
- 2.4. Applications of vermi-composting.

References:

1. Earthworm ecology by LEE
2. Biology of earthworm by Steven son
3. Vermicomposting tech – soil health to human health by Ranganathan L.S.

B.Sc. ZOOLOGY SYLLABUS UNDER CBCS 2019-20

B.Sc. ZOOLOGY II YEAR
SEMESTER- III

PAPER-III (SEC – I): APICULTURE

Instructions: 2hr per week

No. of period: 30

No. of credits: 2

UNIT-I:

(15 Periods)

- 1.1 History, classification and present status of apiculture industry in India
- 1.2 Biology of honey bees and bee economy
- 1.3 Social organization of bee colony
- 1.4 Selection of bee species for apiculture
- 1.5 Bee rearing method: artificial Bee rearing (Apiary), Bee hives

UNIT-II:

(15 Periods)

- 2.1 Products of apiculture industry and its use – honey; Bees wax; propolis
- 2.2 Methods of extraction of honey – indigenous and modern
- 2.3 Bee keeping equipment
- 2.4 Colony inspection and maintenance of the equipment
- 2.5 Bee diseases and enemies; control and preventive method

Suggested Reading:

1. Textbook of Applied Zoology, Telugu Academy.
2. Apiculture by Prost P.J. Oxford and IBH, New Delhi
3. Apiculture by Bisht, ICAR publication



B.Sc. ZOOLOGY SYLLABUS UNDER CBCS 2019-20

B.Sc. ZOOLOGY II YEAR
SEMESTER - III
PAPER-III (SEC – II): PUBLIC HEALTH AND HYGIENE

Instructions: 2hr per week

No. of period: 30

No. of credits: 2

UNIT – I: Nutrition, Environment and Health

(15 Periods)

- 1.1 Classification of foods - Carbohydrates, proteins, lipids, vitamins and minerals
- 1.2 Nutritional deficiencies and disorders- Carbohydrates, proteins, lipids, vitamins and minerals.
- 1.3 Environment and health impact assessment: concept, steps and applications.
- 1.4 Occupational, Industrial, agricultural and urban Health-Exposure at work place, urban areas, health disorders and diseases.
- 1.5 Environmental pollution and associated Health hazards

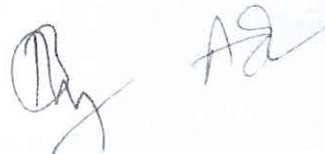
UNIT-II: Communicable and Non-Communicable diseases

(15 Periods)

- 2.1 Causes, Symptoms, Diagnosis, Treatment and Prevention of Communicable diseases - Malaria, Filaria, Measles, Polio, Chicken pox, Rabies, Plague, Leprosy, Tuberculosis and AIDS.
- 2.2 Causes, Symptoms, Diagnosis, Treatment and Prevention of Non-Communicable diseases - Hypertension, Coronary Heart diseases, Stroke, Diabetes, Obesity and Mental ill-health.
- 2.3 Water borne diseases: Cholera, E. coli, Hepatitis and Polio; Air borne diseases: Chickenpox, Influenza, Measles and Tuberculosis
- 2.4 Health care legislation in India – termination of pregnancy act, Maternity benefit act, Transplantation of human organs act, Child Labour act, Biomedical waste act, CSI act. First Aid and Health awareness, personal health care record maintenance.
- 2.5 WHO Programmes – Government and Voluntary Organizations and their health services

Suggested Readings:

1. Park and Park, 1995: Text Book of Preventive and Social Medicine – Banarsidas Bhanot Publ. Jodhpur – India.
2. Public Health at the Crossroads Achievements and Prospects. Robert Beaglehole and Ruth
3. Bonita 2nd Edition Cambridge University Press 3. Maxcy Rosenau Last Public Health &
4. Preventive Medicine, Fourteenth Edition Ed RobertWallace, MD, et al. 4.
5. Epidemiology and Management for Health Care: Sathe, P.V. Sathe, A.P., PopularPrakashan, Mumbai, 1991. 5.
7. International Public Health: Diseases, Programs, Systems, and Policies by
8. MichaelMerson, Robert E Black, Anne J Mills Jones and Bartlett Publishers. 6.



B.Sc. ZOOLOGY II YEAR
SEMESTER - III
PAPER-III (SEC - II): MEDICAL DIAGNOSTICS

Instructions: 2hr per week

No. of period: 30

No. of credits: 2

UNIT-I:

(15 Periods)

- 1.1 Introduction to medical diagnostic and its importance
- 1.2 Diagnostic methods used for analysis of Blood composition smear preparation, Differential leucocytes count (DLC), Cell counting-RBC, WBC platelet, ESR(Erythrocyte sedimentation Rate), PVC(Packed cell volume) Haemoglobin estimation, Bleeding clotting time, Blood grouping and Rh typing.
- 1.3 Bone marrow study, Haemopoiesis, Blood coagulation and anticoagulants, Blood banking, blood transfusion.
- 1.4 Clinical biochemistry – blood glucose, serum protein, LFT(Liver Function Test) Lipid profile LDL, VDL, HDL, cholesterol, creatine kinase, LDH, SGPT, SGOT, Amylase, Bile pigments.
- 1.5 Histopathological techniques, Autopsy and Biopsy, FNAC technique

UNIT-II:

(15 Periods)

- 2.1 Urine analysis Physical chemical, microscopic dialysis analysis of body fluids (CSF Synovial fluid, pleural, pericardial, peritoneal Fluids). Sputum and faecal matter for infection.
- 2.2 Clinical diagnosis of diseases – bacterial (Tuberculosis and Typhoid) antibiotic sensitivity test viral- hepatitis, AIDS, Polio, Protozoan Malaria, Amoebiasis, Helminthes- Ascaris, Taenia solium, Wucheria
- 2.3 Clinical diagnosis of non infection diseases – Diabetes, Hypertension, Asthama, Stroke, Arthritis, Heart attack, Cancer – benign, Malignant metastasis
- 2.4 Concept of Edema, Hyperaemia, Haemorrhage, Hemostasis, Thrombosis, Cellular responses – Hyperplasia, Hypertrapy, Metaplasia, Atropy Necrosis, Apoptosis
- 2.5 Medical Imaging – X-ray, PET(Positron emission tomography), MRI (Magnetic Resonance Imaging), CT Scan ECG, EEG, Echo tests.

Suggested Readings:

1. Cheesebrough M., A Laboratory Manual for Rural Tropical Hospitals, A basis for training course.
2. Kania Mukherjee, Medical Laboratory Techniques Vol-I, II, III, . Tata MC Graw Hill Publishing company
3. Dr. K. N. Sachdev, Jaypee Brothers, (1988) Clinical Pathology and bacterial and medical publisher.
4. Ramnik Sood, Medical laboratory Techniques – Jaypee Brothers.
5. Prakash, G. Lab Manual on Blood Analysis and Medical Diagnostics, S. Chand and Co. Ltd.
6. Robbins and Cotran, Pathology-I Basis of Disease, VIII Edition, Saunders.
7. Guyton A.C. and Hall J. E textbook of Medical Physiology, saunders.
8. Park, K. Preventive and social medicine, B. B. Publishers.



B.Sc. ZOOLOGY SYLLABUS UNDER CBCS 2019-20

**B.Sc. ZOOLOGY II YEAR
SEMESTER –IV**

CORE PAPER – IV CELL BIOLOGY, GENETICS & EVOLUTION

Instructions : 4hr per week

No.of periods : 60

No.of credits : 4

Periods: 60

UNIT – I

Max. Marks: 60

(15 Periods)

1. Cell Biology

1.1. Ultra structure of animal cell, Cell theory, Differences of Prokaryotic and Eukaryotic cells

1.2. Structure and functions of plasma membrane: Structure, composition of Plasma membrane, fluid mosaic model.

1.3. Structure and functions of cell organelles – Endoplasmic reticulum, Golgi body, Ribosomes, Lysosomes

, Mitochondria and Nucleus

1.4. Chromosomes – Structure, types, giant chromosomes

1.5. Cell Division - Mitosis, Meiosis and its regulation.

(15 Periods)

UNIT – II

2. Molecular Biology

2.1 DNA (Deoxyribo Nucleic Acid) – Structure and RNA (Ribo Nucleic Acid) - Structure, types

2.3 DNA Replication (Prokaryotes)

2.4 Protein Synthesis – Transcription and Translation (prokaroytes)

2.5 Gene expression - Genetic Code; operon concept: Lac operon

2.6 Molecular Biology Techniques- Polymerase Chain Reaction and Electrophoresis.

(15 Periods)

UNIT – III

3. Genetics

3.1 Mendals laws of Inheritance and Non-mendilian Inheritance, Incomplete dominance, Co-dominance.

3.2 Linkage and Crossing over, Human Karyotyping and amniocentesis.

3.3. Sex determination and sex-linked inheritance

3.4. Chromosomal Mutations- Deletion, Duplication, Inversion, Translocation, Aneuploid and Polyploidy; Gene mutations, Induced versus spontaneous mutations.

3.5. Inborn errors of metabolism.

(15 Periods)

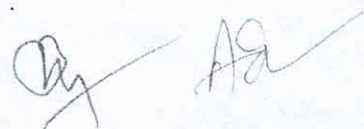
UNIT – IV

4. Developmental Biology and Embryology

4.1 Gametogenesis (Spermatogenesis and Oogenesis), Fertilization, Types of eggs, Types of cleavages

4.2 Gastrulation & Fate maps; Development of Frog up to formation of primary germ layers

4.3 Formation of Foetal membrane in chick embryo and their functions .



B.Sc. ZOOLOGY II YEAR
SEMESTER- IV
PAPER-IV(SEC-3): POULTRY AND ANIMAL HUSBANDRY

Instructions: 2hr per week

No. of period: 30

No. of credits: 2

UNIT -I: Poultry

(15 Periods)

- 1.1 Poultry – present status and future prospects
- 1.2 Methods of Housing – Housing of chicks in floor and cages, Housing growers in cages and floor, Housing of layers on floor and cages, slatted floor
- 1.3 Importance of nutrition in poultry production – Classification of food stuffs and their categorization into energy feeds, protein feeds, minerals and vitamins
- 1.4 Common diseases of poultry and their causative agents, symptoms and treatment
 - (i) Viral diseases – Ranikhet disease, Fowl pox, EDS-76 (Egg Drop Syndrome), infection of bursal disease (gumbolo disease)
 - (ii) Bacterial diseases – Coli bacillosis, Salmonellosis
 - (iii) Fungal diseases – Aspergillosis
 - (iv) Parasitic diseases – Tapeworm, Coccidiosis
- 1.5 Vaccination procedures for broilers, broiler breeders, commercial layers, turkey, duck breeders and commercial ducklings.

UNIT-II: Animal Husbandry

(15 Periods)

- 2.1 Introduction to dairy farming in India and its present and future prospects
- 2.2 Dairy farm- Water supply, Light, Ventilation, Drainage system, Maintenance of recycling of waster and hygienic conditions of farm
- 2.3 Study of general management practices of animals: Grooming, Drying off, control of bad habits, castration, deworming, trimming
- 2.4 Cattle and Buffalo management – Calf raising, management of pregnant, parturient, lactating and dry cows, buffalos and breeding bull, summer management of buffalo
- 2.5 Sheep and Goat management – Management of Lambs and kids, Management of pregnant, parturient and lactating doe, General management practices of pigs

Suggested Readings:

1. Poultry Science and practice – Nilotpal Ghosh, CBS publisher
2. Poultry production and Management - Jagadeesh Prasad, Kalyani publisher
3. A text book of Animal husbandry – C. C. Banjer Joe, IBH publishing
4. A text book of Animal husbandry – S. K. Kaushish, Kalyani publisher

B.Sc. ZOOLOGY SYLLABUS UNDER CBCS 2019-20

B.Sc. ZOOLOGY II YEAR
SEMESTER- IV
PAPER-IV(SEC-3): VERMICULTURE

Instructions: 2hr per week

No. of period: 30

No. of credits: 2

UNIT-I:

(15 Periods)

- 1.1 Scope of vermi technology- Vermiculture and vermi composting – difference between vermiculture and vermi composting –
- 1.2 Earthworm diversity – Ecological groups of earthworms, biology of composting earthworms – *Eoisena foetida*, *Eudrilus lugeniae*.
- 1.3 Soil – Physical, chemical and biological features
- 1.4 Organic waste sources – problems in traditional composting, vermi composting
- 1.5 Types small and large scale pit method, heap method.

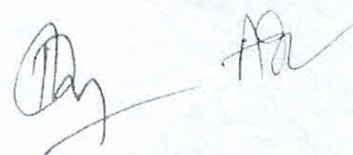
UNIT-II:

(15 Periods)

- 2.1. Vermiculture techniques – vermi culture process – site selection - Selection and collection of species mono and poly culture
- 2.2. Essential parameters for vermi culture – bedding. Methods of harvesting worms general manual methods, self harvesting method, mechanical method
- 2.3. Nutritive value of vermi compost, storing and packing of compost
- 2.4. Applications of vermi composting in agricultural and horticultural practices
- 2.5. Economic of vermi culture, nationalized bank, NABARD support for vermi culture.

References:

1. Earthworm ecology by LEE
2. Biology of earthworm by Steven son
3. Vermicomposting tech – soil health to human health by Ranganathan L.S.



B.Sc. ZOOLOGY SYLLABUS UNDER CBCS 2019-20

**B.Sc. ZOOLOGY III YEAR
SEMESTER - VI
PAPER – VI (SEC-III): VECTOR BIOLOGY**

Instructions: 2hr per week

No. of period: 30

No. of credits: 2

Unit-I: Vector Biology of Public Health Importance (15 Periods)

- 1.1 Introduction to vectors and vectors of human diseases – Public health nuisance.
- 1.2 Salient features and Life cycle of important Mosquito vector species – Anopheles, Aedes, Culex and Mansonia.
- 1.3 Salient features and life cycle of important other Dipteran vectors of public health Importance: Sandflies, Black flies, House flies and Myiasis causing flies.
- 1.4 Life cycle and public health importance of
-Fleas and lice
- 1.5 Life cycle and public health importance of
-Ticks and Mites.

Unit – II: Basic sanitation and Public Health (15 Periods)

- 2.1 Basic sanitation – Hygiene and personal protection – Human wastes and Health – Solid waste and Waste water management.
- 2.2 Distinguishing characters of different species of human malarial parasites Life cycle and host Parasite interactions.
- 2.3 Distinguishing characters of different species of human Filarial parasites Life cycle and host parasite interactions.
- 2.4 Distinguishing characters of different arboviral diseases and their mode of transmission.
- 2.5 Control Measures – Source reduction.



**GOVERNMENT DEGREE COLLEGE FOR WOMEN BEGUMPET, HYDERABAD.
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SYLLABUS FOR B.Sc. ZOOLOGY COURSE (CBCS) 2020-21

B.SC. III YEAR V – SEMESTER

SEC-III

MAX. MARKS: 50

PERIODS: 30

NO. OF CREDITS: 2

BIO-TECHNIQUES

UNIT1: Basic requirements in a biological laboratory

15 periods

- 1.1 Microscopy
- 1.2 Bioreactor
- 1.3 Hot plate stirrer
- 1.4 Ph meter
- 1.5 Spectrophotometer

UNIT2: Laboratory Techniques

15 periods

- 2.1 Staining
- 2.2 Centrifugation
- 2.3 Chromatography
- 2.4 Electrophoresis
- 2.5 PCR

Reference: Bio-techniques by SVS Rana

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B.Sc. ZOOLOGY II YEAR
SEMESTER- IV
PAPER-IV(SEC-4:) BIOMATERIALS FROM ANIMALS SOURCES

Instructions: 2hr per week

No. of period: 30

No. of credits: 2

UNIT-I: Biomaterials Introduction (15 Periods)

- 1.1 Introduction classification, Chemistry and characterization to biomaterial, biocompatibility with medical devices
- 1.2 Types of biomaterials degradable and reabsorbable materials, hydro gels and natural materials
- 1.3 Metallic biomaterial , ceramic biomaterials, composite for biomedical applications
- 1.4 Biomaterials and its applications – muscular skeletal systems
- 1.5 Delivery of drugs: for tissue engineering and regenerative medicine

UNIT-II: Biomaterials and their applications (15 Periods)

- 2.1 Collagen Definition, Types of Collagen, Structure of Collagen, Collagen Sources from Animal Origin Such as Bovine, Porcine, Marine and Fishes; Applications in Pharmaceutical, Tissue Engineering and Biomedical Industries.
- 2.2 Introduction to silk biomaterials: Silk fibroin and silk sericin proteins, molecular structure. Properties of silk fibroin: mechanical strength and biocompatibility. Spider dragline silk structure and properties, production from glands, spinning mechanism, Chemical Composition and Applications.
- 2.3 Structural Properties, Isolation and Processing Methods, Conversion of Chitin to Chitosan, Chemical and Biological properties; Bio Medical Applications.
- 2.4 Physico Chemical Properties, Structure, Synthesis Methods, Mechanism of Action, Physiological Function, Wound and Skin Repairs, Receptors of Hyaluronic Acid and Biomedical Applications
- 2.5 Introduction, elastin- structure, properties, Production from Various Sources, Biological Function and Biomedical Applications

Suggested Readings:

1. Biomaterial science: An introduction to materials in medicine, Buddy D. Ratner, et. al., Elsevier academic press 3rd edition.
2. Biomaterial compositor by Luigi Ambroio 210 CRC press
3. Styata V. Bhat, Biomaterial 2nd edition, Naros Publishing House, New Delhi
4. Biological Materials Science, Biological Materials, Bioinspired Materials, and Biomaterials; Marc André Meyers, Po-Yu Chen.
5. Biomaterials, Medical Devices, and Combination Products; Biocompatibility Testing and Safety Assessment; Shayne Cox Gad, Samantha Gad-McDonald
6. Biologically Responsive Biomaterials for Tissue Engineering. Iulian Antoniac.

B.Sc. ZOOLOGY SYLLABUS UNDER CBCS 2019-20

B.Sc. ZOOLOGY II YEAR
SEMESTER – IV
PAPER-IV(SEC-4) – AQUACULTURE

Instructions: 2hr per week

No. of period: 30

No. of credits: 2

UNIT-I: Aquaculture systems

(15 Periods)

- 1.1 Concept of aquaculture. Culture systems: Freshwater culture. Prawn and fish culture in paddy fields; Brackish water culture; Mariculture: Culture of Oyster, Crab, Lobster, Mussel, Eels, aquatic weeds.
- 1.2 Definition and patterns of Composite fish culture in India. Techniques of composite culture. Culture of Catfishes and miscellaneous fishes.
- 1.3 Preparation and management of fish culture ponds: Nursery, Rearing, and Stocking ponds. Predatory and Weed fishes and their control using fish toxicants. Aquatic insects and their control.
- 1.4 Fertilization. Fish food organisms and their production. Supplementary feeding.
- 1.5 Transport of fish seed and Brood fish. Causes of mortality in transport. Methods for packaging and transport- Open and Closed systems. Use of chemicals, anesthetic drugs, antiseptics and antibiotics in live fish transport.

UNIT-II: Fish pathology and Technologies in Fisheries development

(15 Periods)

- 2.1 Parasitic and Non-parasitic diseases; Fungal infections, Protozoan diseases, Worm diseases.
- 2.2 Fish breeding: Natural and artificial. Harvesting: Fishing techniques, preservation and processing of fish.
- 2.3 Fresh water prawn culture - Introduction. Breeding characteristics. Juvenile prawn migration. Seasonal & regional distribution of seeds. Identification of juveniles. Controlled breeding. Culture: Monoculture and Mixed culture in ponds. Role of hard water in culture of *Macrobrachium* species. Fertilization and feeds.
- 2.4 Pearl culture: Introduction, Pearl producing mollusks, pearl formation, collection and rearing of oysters, insertion of nucleus, harvesting, composition and quality of pearl.
- 2.5 Recirculation technology, Geographic Information System (GIS) technology, use of Information and Communication Technology (ICT) in fishes: production aspects, marketing aspects.

References:

1. Jingran, V.G. (1983). Fish and fisheries of India, Hindustan pub. Corp., New Delhi.
2. Hute, M. and Kahn, H. (2000). Textbook of fish culture, Blackwell Scientific Publication, Australia.
3. Srinivasulu, M., Reddy, K.R.S. Rao, S. (1999). Text book of Aquaculture, Discovery Publishing House, New Delhi.
4. Yawn Mehta, Fisheries & Aquaculture Biotechnology (2011). Campus Books International, Pahalad street, Ansari Road, Durga Ganj, New Delhi.

B.Sc. ZOOLOGY II YEAR
SEMESTER – IV
PAPER-IV(SEC-4) – AQUARIUM FISH KEEPING

Instructions: 2hr per week

No. of period: 30

No. of credits: 2

UNIT- I: Designing and preparation of aquaria with all accessories (15 Periods)

- 1.1 Importance, history and scope of aquarium fish keeping as a Cottage Industry.
- 1.2 Aquarium fabrication- shape, size, volume, type of glass tank, cutting of glass, preparation of glass tank, strengthening and supporting of tank; aquarium floor setting- type and size of pebbles, gravels, granites used for bed setting and its advantages.
- 1.3 Filters-biological, chemical and mechanical. Aquarium accessories like aerators, decorative, lighting, heating and feeding trays.
- 1.4 Water quality management in aquarium systems-sources of water, temperature, pH, dissolved oxygen, carbon dioxide, ammonia, hardness, turbidity.
- 1.5 Aquarium plants: Uses of different varieties of submerged plants (tubers, rooted plants) and emerged plants.

UNIT- II: Biology, food & feeding and control of diseases of aquarium fishes (15 Periods)

- 2.1 Common characters and sexual dimorphism of common freshwater and marine exotic and indigenous species of aquarium fishes: Guppy, Molly, Sword tail, Gold fish, Angel fish, Blue morph, Anemone fish and Butterfly fish.
- 2.2 Food and feeding Use of live fish feed organisms (Artemia, Infusoria, Spirulina). Preparation and composition of formulated fish feed.
- 2.3 Brood stock management: Maintenance of breeding conditions- pH, temperature and sex ratio; Selective breeding and hybridization techniques, induced breeding, colour enhancement techniques.
- 2.4 Common diseases of aquarium fishes – their causative agents viz., virus, bacteria, fungi, protozoa and nematodes; symptoms, treatment and prophylactic measures.
- 2.5 Budget for setting up an Aquarium Fish Farm as a Cottage Industry.

References:

1. Hansen, J. (1979). Making your own aquarium. Bell and Hyman Ltd., London.
2. Axelord, H.R. (1967). Breeding aquarium fishes, T F H Publications.
3. Lovell, T. (1998). Nutrition and feeding of fish. Second Ed. Kluwer Academic publishers.
4. Mills, D. and Vevers, G. (1982). The Practical encyclopedia of fresh water, Tropical Aquarium fishes, Salamander Books Limited, London.
5. Brunner, G. (1973). Aquarium plants, T F H Publications Inc. Ltd., Hongkong.
6. Mills, D. (1981). Aquarium Fishes, Arco publishing.
7. Gahlawat, S.K., et. al. (2007). Manual of experimental Ichthyology, Daya publishing House, Delhi.
8. Talwar, P.K., and Jhingran, A.G. (1991). Inland fishes. Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.

GOVERNMENT DEGREE COLLEGE FOR WOMEN BEGUMPET, HYDERABAD.

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B.Sc. ZOOLOGY SYLLABUS UNDER CBCS 2018-21

B.Sc. ZOOLOGY III YEAR

SEMESTER –V

DSC/Module –V /Core-V/PAPER-V

ANIMAL PHYSIOLOGY

Instructions : 4hr per week

No.of periods : 60

No.of credits : 4

Periods: 60

Max. Marks: 75

UNIT – I

(15 Periods)

1.1 DIGESTION

1.1.1 Digestion definition and extra and intracellular digestion.

1.1.2 Digestion of Carbohydrates, Proteins, Lipids and Cellulose.

1.1.3 Absorption and Assimilation of digested food; role of Gastrointestinal hormones in digestion.

1.1.4 Disorders of Alimentary canal.

1.2 RESPIRATION

1.2.1 Definition of Respiration and Respiratory mechanisms – External, Internal and cellular.

1.2.2 Respiratory Pigments; Transport of oxygen, Oxygen dissociation curves. Bohr's effect.

1.2.3 Transport of CO₂, Chloride shift; Regulation of respiration – nervous and chemical.

1.2.4 Disorders of respiratory tract

UNIT-II

(15 periods)

2.1 CIRCULATION

2.1.1 Types of circulation - Open and Closed circulation

2.1.2 Structure of Mammalian Heart, Types of hearts – Neurogenic and Myogenic; Heart function – Conduction and regulation of heart beat.

2.1.3 Regulation of Heart rate – Tachycardia and Bradycardia,

2.1.4 Blood Clotting mechanism

2.2 EXCRETION

2.2.1 Classification of Animals on the basis of excretory products- Ammonotelic, Uricotelic, Ureotelic

2.2.2 Internal structure of kidney and Nephron.

2.2.3 Urine formation, Counter current mechanism.

UNIT – III

(15 periods)

3.1. MUSCLE CONTRACTION

3.1.1 Types of Muscles

3.1.2 Ultra structure of skeletal muscle fibre

3.1.3 Sliding Filament theory, muscle contraction mechanism. Biochemical changes during muscle contraction.

3.2. NERVE IMPULSE

3.2.1 Structure of Neuron

3.2.2 Nerve impulse - Resting potential and Action potential and Conduction of Nerve impulse

3.2.3 Synapse, types of synapses and Synaptic transmission.

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UNIT – IV

(15 periods)

4.1 ENDOCRINE SYSTEM

4.1.1 Endocrine glands - Structure, secretions and functions of Pituitary, Thyroid, Parathyroid, Adrenal gland and Pancreas

4.1.2 Hormone action and concept of Secondary messengers

4.1.3 Male and Female Hormones, Hormonal control of Menstrual cycle in humans.

4.2. HOMEOSTASIS AND ENZYMES

4.2.1 Concept and Mechanism of Homeostasis

4.2.2 Osmoregulation - Water and ionic regulation by freshwater, brackish water and marine animals

4.2.3 Enzymes: Definition, Classification, Inhibition and Regulation.

Suggested readings

1. Gerard J. Tortora and Sandra Reynolds Garbowski Principles of Anatomy and Physiology, Tenth Ed., John Wiley & Sons
2. Arthur C. Guyton MDA Text Book of Medical Physiology, Eleventh ed., John E. Hall, Harcourt Asia Ltd.
3. William F. Ganong A Review of Medical Physiology 22 ed, McGraw Hill, 2005
4. Sherwood, Klandrof, Yanc, Animal Physiology Thompson Brooks/Coole, 2005.
5. Sherwood, Klandrof, Yanc, Human Physiology. Thompson Brooks/Coole, 2005.
6. Knut Schmidt-Nielson, Animal Physiology 5th ed, Cambridge Low Price Edition.
7. Roger Eckert and Randal, Animal Physiology 4th ed, Freeman Co, New York
8. Singh. H.R, Text Book of Animal Physiology and Biochemistry
9. Nagabhushanam , Comparative Animal Physiology
10. Veer Bal Rastogi, Text Book of Animal Physiology



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SYLLABUS FOR B.Sc. ZOOLOGY COURSE (CBCS) 2020-21

B.Sc. ZOOLOGY III YEAR

SEMESTER –V

SERICULTURE

DSE/ PAPER-VI

Instructions : 4hr per week

No.of credits : 4

Periods: 60

Max. Marks: 75

UNIT-I: Introduction of sericulture

15 (periods)

- 1.1. History of sericulture and present status of Sericulture industry in India.
- 1.2. Sericulture as agro-industry –perspectives and prospectus of Sericulture in India.
- 1.3. Geographical distribution of various species and economic races of silkworms- Mulberry, Tasar, Eri and Muga silkworm..
- 1.4. Types of silkworm host plants and their systematic position.

Unit-II: Biology of silkworms

15 (periods)

- 2.1. Morphology and anatomy of silk glands.
- 2.2. Properties and composition of silk.
- 2.3. Life cycle, external morphology and biology of Mulberry silkworm.
- 2.4. Internal morphology of silkworm- Digestive , Respiratory, Nervous, Excretory and Reproductive systems.

Unit-III: Diseases of Silkworm

15 (periods)

- 3.1. Influence of biotic and abiotic factors on the incidence of diseases.
- 3.2. Diseases of Bombyx mori and Philosomia ricini- viral and bacterial, Preventive and control measures.
- 3.3. Diseases of Bombyx mori and Philosomia ricini- fungal and protozoan, Preventive and control measures.
- 3.4. Insect and vertebrate pests of silkworm and their management.

Unit-IV: Silkworm rearing

15 (periods)

- 4.1. Silkworm rearing house and rearing appliances.
- 4.2. Feeding and rearing methods of mulberry silkworms.
- 4.3. Mounting and harvesting of mulberry silk cocoons.
- 4.4. Commercial characters of cocoons and price fixation.

References:

1. Handbook of sericulture – S.R. Ullal and M. N. Varasimhanna
2. An introduction to sericulture – G. Ganga, J. Sulochana Chetty
3. Manual of Sericulture – FA O Volumes



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SYLLABUS FOR B.Sc. ZOOLOGY COURSE (CBCS)

SEMESTER –VI

DSC/Module –VII /Core-VII/PAPER-VII

Immunology and Animal Biotechnology

Instructions : 4hr per week

No.of periods : 60

No.of credits : 4

Periods: 60

Max. Marks: 75

Unit I: Immunology- Basic concepts: Antigens and Antibodies

- 1.1. Basic concepts of Immunology. Cells , Primary and secondary organs of immune system
- 1.2. Types of immunity- innate and acquired
- 1.3. Structure, function and types of antigens and antibodies. Epitopes, Haptens, adjuvants
Antigen-antibody reactions.
- 1.4. T cell and B cell activation. Monoclonal antibodies and their production

Unit II: Working of an Immune system :

- 2.1. Structure and functions of Major histocompatibility complex.
- 2.2. Basic properties and functions of Cytokines, Interferons and Complement proteins.
- 2.3. Humoral and cell mediated immunity.
- 2.4. Types of Hyper sensitivity, concepts of autoimmunity and immunodeficiency.

UNIT III: Animal Biotechnology

- 3.1. Concept and scope of Animal Biotechnology.
- 3.2. Cloning vectors – Plasmids, Cosmids , Lambda bacteriophage, YAC
- 3.3. Cloning – Cloning methods (cell, animal and gene cloning)
- 3.4. Animal cell culture- Equipment and materials for animal cell culture, and applications.

UNIT IV: Animal Biotechnology and Genetically modified organisms

- 4.1. Recombinant DNA technology and its application.
- 4.2. Transgenesis- Methods of Transgenesis. Application of transgenic animals in biotechnology
- 4.3. Stem cells- types and their applications.
- 4.4. Introduction to vaccines and types of vaccines.



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SYLLABUS FOR B.Sc. ZOOLOGY COURSE (CBCS) 2020-21
Semester VI DSE-II(A)- PAPER- VIII
AQUATIC BIOLOGY

Instructions : 4hr per week

No.of periods : 60

No.of credits : 4

Periods: 60

Max. Marks: 75

UNIT – I Aquatic Biomes

(15 periods)

- 1.1 Brief introduction of the aquatic biomes
- 1.2 Freshwater ecosystem (lakes, wetlands, streams and rivers),
- 1.3 Estuaries, intertidal zones,
- 1.4 Oceanic pelagic zone, marine benthic zone.

UNIT – II Fresh Water Biology

(15 periods)

- 2.1 Coral reefs
- 2.2 Lakes: Origin and classification of lakes
- 2.3 Lake as an Ecosystem, Lake morphometry
- 2.4 Physico-chemical Characteristics of fresh water bodies: Light, Temperature, Thermal stratification, Dissolved Solids, Carbonate, Bicarbonates, Phosphates and Nitrates, Turbidity: dissolved gases (Oxygen, Carbon dioxide).

UNIT – III Marine Biology

(15 periods)

- 3.1 Nutrient Cycles and Lakes- Nitrogen, Sulphur and Phosphorous.
- 3.2 Streams: Different stages of stream development, Physico-chemical environment, adaptation of hill stream fishes.
- 3.3 Salinity and density of sea water; Continental shelf; Adaptation of deep sea organisms; Sea weeds.
- 3.4 Eutrophication

UNIT – IV Management of Aquatic Resources

(15 periods)

- 4.1 Aquatic pollution - Causes of pollution: Agricultural, Industrial, Sewage, Thermal and Oil spills,
- 4.2 Management and conservation
- 4.3 Water pollution acts of India
- 4.4 Sewage treatment and water quality assessment – BO D and COD

References

1. Ecology – P Odum.
2. Ecology and environment – P D Sharma.
3. Fundamentals of Ecology- P Odum and Gary W Barrett.

GOVERNMENT DEGREE COLLEGE FOR WOMEN BEGUMPET, HYDERABAD.

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SYLLABUS FOR B.Sc. ZOOLOGY COURSE (CBCS) 2020-21

B.SC. III YEAR VI – SEMESTER

SEC-IV

PERSPECTIVES OF FOOD SAFETY IN INDIA

PERIODS: 30

MAX. MARKS: 50

NO. OF CREDITS: 2

UNIT1. FOOD SAFETY AND QUALITY CONTROL

15 periods

- 1.1 Selecting and purchasing food, Understanding food labels
- 1.2 Storing raw foods and cooked foods
- 1.3 Definition of food adulteration and common adulterants present in food

UNIT2. HYGIENE AND SANITATION

15 periods

- 2.1 Definition of hygiene and sanitation
- 2.2 Personal hygiene of food Handler
- 2.3 Pest control and garbage disposal

REFERENCE: 1. The pink book –food smart by FSSAI

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SYLLABUS FOR B.Sc. ZOOLOGY COURSE (CBCS) 2020-21

V - SEMESTER

Generic Elective- I, Paper – I

NUTRITION AND DIETETICS

Periods: 30

Max. Marks: 50

UNIT – I

(15 Periods)

- 1.1. Nutrition of children, pregnant and lactating mothers.
- 1.2. Diet obesity and underweight, Principles of diet therapy.
- 1.3. Balanced diet and nutritional disorders.
- 1.4. Food allergy, food habits- health effects.

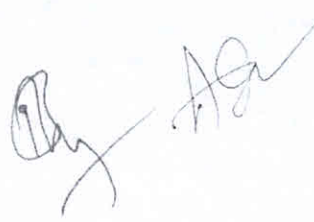
UNIT – II

(15 Periods)

- 2.1. Basic Macronutrients and Micronutrients.
- 2.2 Vitamins and Minerals, Significance of Water and fibre.
- 2.3 Nutritive value of Cereals, Grains, Fruits and Vegetables.
- 2.4. Malnutrition and their effects.

REFERENCES:

1. Textbook of Nutrition- Rathode.
2. A hand book of Medical laboratory technology – NIN Manuals.
3. Medical Laboratory technology – (vol-I & vol-II)- NIN Manuals

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GOVERNMENT DEGREE COLLEGE FOR WOMEN BEGUMPET, HYDERABAD.
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SYLLABUS FOR B.Sc. ZOOLOGY COURSE (CBCS) 2020-21
VI - SEMESTER
Generic Elective – II, Paper – II
CLINICAL SCIENCE

Periods: 30

Max. Marks: 50

UNIT – I: HAEMATOLOGY

(15 Periods)

- 1.1 Introduction of Haematology; Structure, Composition and functions of blood;
Origin of blood cells (RBC, WBC, PLATELETS)
- 1.2 Blood coagulation and theories of blood coagulation, anticoagulants
- 1.3 Blood groups and Rh factor; Blood Transfusion and Blood Banking
- 1.4 Blood associated disorders – Anaemia, Leucopaenia, Leucocytosis, Leukaemia and Haemophilia

UNIT – II: IMMUNOLOGY

(15 Periods)

- 2.1. Types of Immunity – Innate and Acquired; Antigens and Antibodies
- 2.2. Immunoglobulins – Classifications and significance; Complement system.
- 2.3. Lymphatic system and Lymphoid organs – Spleen, Thymus, Lymph nodes.
- 2.4. T-cells, B-cells and Macrophages.

REFERENCES:

1. Textbook of Microbiology – R. Anantharayan and CKJ. Paniker
2. Immunology- Kuby
3. A hand book of Medical laboratory technology – V.H. Talib
4. Medical Laboratory technology – (vol-I & vol-II) – Kanai.L. Mukherjee

200077



UNION PUBLIC SERVICE COMMISSION

EXAMINATION NOTICE NO. 04/2021-CSP

DATE: 04/03/2021

(LAST DATE FOR RECEIPT OF APPLICATIONS: 24/03/2021) of CIVIL SERVICES EXAMINATION, 2021

(The Commission's Website: www.upsc.gov.in)

IMPORTANT

1. **CANDIDATES TO ENSURE THEIR ELIGIBILITY FOR THE EXAMINATION:** All candidates (male/female/transgender) are requested to carefully read the Rules of Civil Services Examination notified by the Government (Department of Personnel and Training) and this Notice of Examination derived from these Rules. The Candidates applying for the examination should ensure that they fulfill all eligibility conditions for admission to examination. Their admission to all the stages of the examination will be purely **provisional** subject to satisfying the prescribed eligibility conditions. Mere issue of e-Admit Card to the candidate will not imply that his/her candidature has been finally cleared by the Commission. The Commission takes up verification of eligibility conditions with reference to original documents only after the candidate has qualified for Interview/Personality Test.
2. **HOW TO APPLY:**

Candidates are required to apply Online by using the website <https://upsconline.nic.in> Detailed instructions for filling up online applications are available on the above mentioned website. Brief Instructions for filling up the "Online Application Form" given in Appendix-IIA.

 - 2.1 Candidate should have details of one Photo ID Card viz. Aadhaar Card/Voter Card/PAN Card/Passport/Driving Licence/Any other Photo ID Card issued by the State/Central Government. The details of this Photo ID Card will have to be provided by the candidate while filling up the online application form. The candidates will have to upload a scanned copy of the Photo ID whose details have been provided in the online application by him/her. This Photo ID Card will be used for all future referencing and the candidate is advised to carry this Photo ID Card while appearing for Examination/Personality Test.
 - 2.2 The facility of withdrawal of Application is available for those candidates who do not want to appear for Civil Services (Preliminary) Examination. In this regard, Instructions are mentioned in Appendix IIB of this Examination Notice
3. **LAST DATE FOR RECEIPT OF APPLICATIONS :**

The online Applications can be filled up to 24th March, 2021 till 6:00 PM. The eligible candidates shall be issued an e-Admit Card three weeks before the commencement of the examination. The e-Admit Card will be made available in the UPSC website [<https://upsconline.nic.in>] for downloading by candidates. No Admit Card will be sent by post.
4. **PENALTY FOR WRONG ANSWERS:**

Candidates should note that there will be penalty (negative marking) for wrong answers marked by a candidate in the Objective Type Question Papers.
5. **FACILITATION COUNTER FOR GUIDANCE OF CANDIDATES:**

Government strives to have a workforce which reflects gender balance and women candidates are encouraged to apply.

In case of any guidance/information/clarification regarding their applications, candidature etc. candidates can contact UPSC's Facilitation Counter near gate 'C' of its campus in person or over Telephone No. 011-23385271/011-23381125/011-23098543 on working days between 10.00 hrs and 17.00 hrs.

6. MOBILE PHONES BANNED:

- (a) The use of any mobile phone (even in switched off mode), pager or any electronic equipment or programmable device or storage media like pen drive, smart watches etc. or camera or blue tooth devices or any other equipment or related accessories either in working or switched off mode capable of being used as a communication device during the examination is strictly prohibited. Any infringement of these instructions shall entail disciplinary action including ban from future examinations.
- (b) Candidates are advised in their own interest not to bring any of the banned items including mobile phones/pagers to the venue of the examination, as arrangement for safe-keeping cannot be assured.

7. Candidates are advised not to bring any valuable/costly items to the venue of the examination, as safe-keeping of the same cannot be assured. Commission will not be responsible for any loss in this regard.

F. No. 1/13/2020-E.I(B) : Preliminary Examination of the Civil Services Examination for recruitment to the Services and Posts mentioned below will be held by the Union Public Service Commission on 27th June, 2021 in accordance with the Rules published by the Department of Personnel & Training in the Gazette of India Extraordinary dated 4th March, 2021. All candidates must carefully read the Civil Services Examination-2021 Rules together with all the Appendices along with the Annexures thereof and this Examination Notice derived from the CSE Rules, 2021 in entirety for gaining awareness of the current Rules and Regulations as changes may have been incorporated since the previous Examination Rules.

- (i) Indian Administrative Service
- (ii) Indian Foreign Service
- (iii) Indian Police Service
- (iv) Indian Audit and Accounts Service, Group 'A'
- (v) Indian Civil Accounts Service, Group 'A'
- (vi) Indian Corporate Law Service, Group 'A'
- (vii) Indian Defence Accounts Service, Group 'A'
- (viii) Indian Defence Estates Service, Group 'A'
- (ix) Indian Information Service, Junior Grade Group 'A'
- (x) Indian Postal Service, Group 'A'
- (xi) Indian P&T Accounts and Finance Service, Group 'A'
- (xii) Indian Railway Protection Force Service, Group 'A'
- (xiii) Indian Revenue Service (Customs & Indirect Taxes) Group 'A'
- (xiv) Indian Revenue Service (Income Tax) Group 'A'
- (xv) Indian Trade Service, Group 'A' (Grade III)
- (xvi) Armed Forces Headquarters Civil Service, Group 'B' (Section Officer's Grade)
- (xvii) Delhi, Andaman and Nicobar Islands, Lakshadweep, Daman & Diu and Dadra & Nagar Haveli Civil Service (DANICS), Group 'B'
- (xviii) Delhi, Andaman and Nicobar Islands, Lakshadweep, Daman & Diu and Dadra & Nagar

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UPSC Mains

independence of disturbances concept of structure and model for simultaneous equations, problem of identification-rank and order conditions of identifiability, two-stage least square method of estimation.

Present official statistical system in India relating to population, agriculture, industrial production, trade and prices, methods of collection of official statistics, their reliability and limitations, principal publications containing such statistics, various official agencies responsible for data collection and their main functions.

4. Demography and Psychometry :

Demographic data from census, registration, NSS other surveys, their limitations. and uses, definition, construction and uses of vital rates and ratios, measures of fertility, reproduction rates, morbidity rate, standardized death rate, complete and abridged life tables, construction of life tables from vital statistics and census returns, uses of life tables, logistic and other population growth curves, fitting a logistic curve, population projection, stable population, quasi-stable population, techniques in estimation of demographic parameters, standard classification by cause of death, health surveys and use of hospital statistics.

Methods of standardisation of scales and tests, Z-scores, standard scores, T-scores, percentile scores, intelligence quotient and its measurement and uses, validity and reliability of test scores and its determination, use of factor analysis and path analysis in psychometry.

ZOOLOGY

PAPER-I

1. Non-chordata and Chordata :

- (a) Classification and relationship of various phyla up to subclasses: Acoelomate and Coelomate, Protostomes and Deuterostomes, Bilateria and Radiata; Status of Protista, Parazoa, Onychophora and Hemichordata; Symmetry.
- (b) Protozoa: Locomotion, nutrition, reproduction, sex; General features and life history of *Paramecium*, *Monocystis*, *Plasmodium* and *Leishmania*.
- (c) Porifera: Skeleton, canal system and reproduction.
- (d) Cnidaria: Polymorphism, defensive structures and their mechanism; coral reefs and their formation; metagenesis; general features and life history of *Obelia* and *Aurelia*.
- (e) Platyhelminthes: Parasitic adaptation; general features and life history of *Fasciola* and *Taenia* and their-Pathogenic symptoms.
- (f) Nematelminthes: General features, life history, parasitic adaptation of *Ascaris* and *Wuchereria*.
- (g) Annelida: Coelom and metamerism; modes of life in polychaetes; general features and life history of Nereis, earthworm and leach.
- (h) Arthropoda: Larval forms and parasitism in Crustacea; vision and respiration in arthropods (Prawn, cockroach and scorpion); modification of mouth, parts in insects (cockroach, mosquito, housefly, honey bee and butterfly), metamorphosis in insect and its hormonal regulation, socialbehaviour of *Apis* and termites.
- (i) Molluscs: Feeding, respiration, locomotion, general features and life history of

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Lamellidens, Pila and Sepia. Torsion and detorsion in gastropods.

- (j) Echinodermata: Feeding, respiration, locomotion, larval forms, general features and life history of *Asterias*.
- (k) Protochordata: Origin of chordates; general features and life history of *Branchiostoma* and *Herdmania*.
- (l) Pisces: Respiration, locomotion and migration.
- (m) Amphibia: Origin of tetrapods, parental care, paedomorphosis.
- (n) Reptilia; Origin of reptiles, skull types, status of *Sphenodon* and crocodiles.
- (o) Aves: Origin of birds, flight adaptation, migration.
- (p) Mammalia: Origin of mammals, dentition, general features of egg laying mammals, pouchedmammals, aquatic mammals and primates, endocrine glands (pituitary, thyroid, parathyroid, adrenal, pancreas, gonads) and their interrelationships.
- (q) Comparative functional anatomy of various systems of vertebrates. (integument and its derivatives, endoskeleton, locomotory organs, digestive system, respiratory system, circulatory system including heart and aortic arches, urinogenital system, brain and sense organs (eye and ear).

2. Ecology :

- (a) Biosphere: concept of biosphere; biomes, Biogeochemical cycles, Human induced changes in atmosphere including green house effect, ecological succession, biomes and ecotones, community ecology.
- (b) Concept of ecosystem; structure and function of ecosystem, types of ecosystem, ecological succession, ecological adaptation.
- (c) Population; characteristics, population dynamics, population stabilization.
- (d) Biodiversity and diversity conservation of natural resources.
- (e) Wildlife of India.
- (f) Remote sensing for sustainable development.
- (g) Environmental biodegradation; pollution and its impact on biosphere and its prevention.

3. Ethology :

- (a) Behaviour: Sensory filtering, responsiveness, sign stimuli, learning and memory, instinct, habituation, conditioning, imprinting.
- (b) Role of hormones in drive; role of pheromones in alarm spreading; crypsis, predator detection, predator tactics, social hierarchies in primates, social organization in insects;
- (c) Orientation, navigation, homing; biological rhythms: biological clock, tidal, seasonal and circadian rhythms.
- (d) Methods of studying animal behaviour including sexual conflict, selfishness, kinship and altruism.

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4. Economic Zoology :

- (a) Apiculture, sericulture, lac culture, carp culture, pearl culture, prawn culture, vermiculture.
- (b) Major infectious and communicable diseases (malaria, filaria, tuberculosis, cholera and AIDS) their vectors, pathogens and prevention.
- (c) Cattle and livestock diseases, their pathogen (helminths) and vectors (ticks, mites, Tabanus, Stomoxys).
- (d) Pests of sugar cane (*Pyrrilla perpusiella*), oil seed (*Achaeajanata*) and rice (*Sitophilus oryzae*).
- (e) Transgenic animals.
- (f) Medical biotechnology, human genetic disease and genetic counselling, gene therapy.
- (g) Forensic biotechnology.

5. Biostatistics :

Designing of experiments; null hypothesis; correlation, regression, distribution and measure of central tendency, chi square, student-test, F-test (one-way & two-way F-test).

6. Instrumentation methods :

- (a) Spectrophotometer, phase contrast and fluorescence microscopy, radioactive tracer, ultra centrifuge, gel . electrophoresis, PCR, ELISA, FISH and chromosome painting.
- (b) Electron microscopy (TEM, SEM).

PAPER II

1. Cell Biology :

- (a) Structure and function of cell and its organelles (nucleus, plasma membrane, mitochondria, Golgi bodies, endoplasmic reticulum, ribosomes and lysosomes), cell division (mitosis and meiosis), mitotic spindle and mitotic apparatus, chromosome movement chromosome type ploytene and lambrush, organization of chromatin, heterochromatin, Cell cycle regulation.
- (b) Nucleic acid topology, DNA motif, DNA replication, transcription, RNA processing, translation, protein foldings and transport.

2. Genetics :

- (a) Modern concept of gene, split gene, genetic regulation, genetic code.
- (b) Sex chromosomes and their evolution, sex determination in Drosophila and human.
- (c) Mendel's laws of inheritance, recombination, linkage, multiple alleles, genetics of blood groups, pedigree analysis, hereditary diseases in human.
- (d) Mutations and mutagenesis.
- (e) Recombinant DNA technology, plasmid, cosmid, artificial chromosomes as vectors, transgenics, DNA cloning and whole animal cloning (principles and methods).

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- (f) Gene regulation and expression in prokaryotes and eukaryotes.
- (g) Signal molecules, cell death, defects in signaling pathway and consequences.
- (h) RFLP, RAPD and AFLP and application of RFLP in DNA finger-printing, ribozyme technologies, human genome project, genomics and proteomics.

3. Evolution :

- (a) Theories of origin of life.
- (b) Theories of evolution; Natural selection, role of mutation in evolution, evolutionary patterns, molecular drive, mimicry, variation, isolation and speciation.
- (c) Evolution of horse, elephant and human using fossil data.
- (d) Hardy-Weinberg Law.
- (e) Continental drift and distribution of animals.

4. Systematics :

Zoological nomenclature, international code, cladistics, molecular taxonomy and biodiversity.

5. Biochemistry :

- (a) Structure and role of carbohydrates, fats, fatty acids, cholesterol, proteins and amino-acids, nucleic acids. Bioenergetics.
- (b) Glycolysis and Krebs cycle, oxidation and reduction, oxidative phosphorylation; energy conservation and release, ATP, cyclic AMP-its structure and role.
- (c) Hormone classification (steroid and peptide hormones), biosynthesis and functions.
- (d) Enzymes: types and mechanisms of action.
- (e) Vitamins and co-enzymes.
- (f) Immunoglobulin and immunity.

6. Physiology (with special reference to mammals) :

- (a) Composition and constituents of blood; blood groups and Rh factor in human; factors and mechanism of coagulation; iron metabolism, acid-base balance, thermo regulation, anticoagulants.
- (b) Haemoglobin: Composition, types and role in transport of oxygen and carbon dioxide.
- (c) Digestion and absorption: Role of salivary glands, liver, pancreas and intestinal glands.
- (d) Excretion: nephron and regulation of urine formation; osmo-regulation and excretory product.
- (e) Muscles: Types, mechanism of contraction of skeletal muscles, effects of exercise on muscles.
- (f) Neuron: nerve impulse—its conduction and synaptic transmission; neurotransmitters.
- (g) Vision, hearing and olfaction in human.
- (h) Physiology of reproduction puberty and menopause in human.

7. Developmental Biology :

- (a) Gametogenesis; spermatogenesis, composition of semen, in vitro and in vivo capacitation of mammalian sperm, Oogenesis, totipotency; fertilization, morphogenesis and morphogen;

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blastogenesis, establishment of body axes formation, fate map, gastrulation in frog and chick; genes in development in chick homeotic genes, development of eye and heart, placenta in mammals.

(b) Cell lineage, cell to cell interaction, Genetic and induced teratogenesis, role of thyroxine in control of metamorphosis in amphibia, paedogenesis and neoteny, cell death, aging.

(c) Developmental genes in human, in vitro fertilization; and embryo transfer; cloning.

(d) Stem cells: Sources, types and their use in human welfare.

(e) Biogenetic law.

APPENDIX-IIA

INSTRUCTIONS TO THE CANDIDATES FOR FILLING ONLINE APPLICATIONS

- Candidates are required to apply Online using the website www.upsconline.nic.in.
- Salient features of the system of Online Application Form are given hereunder:
- Detailed instructions for filling up online applications are available on the above mentioned website.
- Candidates will be required to complete the Online Application Form containing two stages viz. Part-I and Part-II as per the instructions available in the above mentioned site through drop down menus.
- The candidates are required to pay a fee of Rs.100/- Rupees One Hundred only) [excepting SC/ST/ Female/Persons with Benchmark Disability candidates who are exempted from payment of fee] either by depositing the money in any branch of State Bank of India by cash, or by using net banking facility of State Bank of India or by using any Visa/Master/RuPay Credit/ Debit Card.
- Before start filling up Online Application, a candidate must have his photograph and signature duly scanned in the .jpg format in such a manner that each file should not exceed 300 KB each and must not be less than 20 KB in size for the photograph and signature.
- The candidate should have details of one Photo ID viz. Aadhar Card/ Voter Card / PAN Card / Passport/ Driving License / Any other photo ID card issued by the State / Central Government. The details of this photo ID will have to be provided by the candidate while filling up the online application form. The candidates will have to upload a scanned copy of the Photo ID whose details have been provided in the online application by him/her. This photo ID will be used for all future references and the candidate is advised to carry this ID while appearing for the examination.
- The Online applications (Part I and II) can be filled from 4th March, 2021 to 24th March, 2021 till 18:00 Hrs.
- Applicants should avoid submitting multiple applications. However, if due to any unavoidable circumstances, any applicant submits multiple applications then he/she must ensure that the applications with higher RID is complete in all respects.
- In case of multiple applications, the applications with higher RID shall be entertained by the Commission and fee paid against one RID shall not be adjusted against any other RID.
- The applicants must ensure that while filling their Application Form, they are providing their

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