CBCS SYLLABUS FOR 2019-2020

UNDER GRADUATE DEGREE COURSE

DEPARTMENT OF ZOOLOGY

UNIVERSITY COLLEGE OF SCIENCE

OSMANIA UNIVERSITY

HYDERABAD

B.Sc. ZOOLOGY SYLLABUS UNDER CBCS 2019-20

Department of Zoology (46 credits)

Structured syllabus under CBCS for 2019-20 onwards to under graduate course

I. Discipline core course: (5 credits each) (I, II, III, IV Semester)

1. Animal Diversity – Invertebrates
2. Animal Diversity – Vertebrates
3. Animal Physiology and Animal Behaviour
4. Cell Biology, Genetics, and Developmental Biology

II. Discipline specific Elective: (5 credits each – any one paper in V Semester and VI Semester

1. Physiological Chemistry and Endocrinology
2. Immunology and Animal Biotechnology
3. Laboratory Animals Maintenance and Applications
4. Fisheries
5. Limnology
6. Ecology, Zoogeography and Evolution

III. Skill enhancement course: (2 credits) 2 paper in III Semester and 2 papers in IV Semester)

1. Sericulture
2. Apiculture
3. Public health and hygiene
4. Medical diagnostics
5. Poultry and Animal husbandry
6. Vermiculture
7. Vector biology
8. Biomaterial from Animal Source
9. Aquaculture
10. Aquarium Fish Keeping

IV. Generic elective (Open stream) – (4 credit only in V Semester)

1. Preventive Medicine
2. Integrated Pest Management

V. Project/optional paper (4 credit only in VI Semester) In case of not opting project

1. Tools and Techniques in Biology

CHAIR MEN
Board of Studies in Zoology.
Osmania University, Hyd-07.

B.Sc. ZOOLOGY SYLLABUS UNDER CBCS 2019-20

CURRICULUM FOR ZOOLOGY
IN UNDER GRADUATE DEGREE PROGRAMME
CBCS SYLLABUS SCHEDULE 2019-20
Osmania University

Year	Semester	Paper		Title of the Paper	No. of Credits	Exam Hrs.	Max. Marks		
							I.A	End Exam	Total
I	I	Paper - I	Core-I Theory	Animal Diversity- Invertebrates	4	2	20	80	100
			Core-I Practical	Animal Diversity- Invertebrates	1	2	10	40	50
	II	Paper – II	Core-II Theory	Animal Diversity- Vertebrates	4	2	20	80	100
			Core-II Practical	Animal Diversity- Vertebrates	1	2	10	40	50
II	III	Paper – III	Core-III Theory	Animal Physiology and Animal Behaviour	4	2	20	80	100
			Core-III Practical	Animal Physiology and Animal Behaviour	1	2	10	40	50
			SEC-1	Sericulture / Apiculture	2	2	10	40	50
			SEC-2	Public Health and Hygiene/ Medical Diagonistics	2	2	10	40	50
	IV	Paper - IV	Core-IV Theory	Cell Biology, Genetics, and Developmental Biology	4	2	20	80	100
			Core-IV Practical	Cell Biology, Genetics, and Developmental Biology	1	2	10	40	50
			SEC-3	Poultry and Animal Husbandry/ Vermiculture/ Vector Biology	2	2	10	40	50
			SEC-4	Biomaterials from Animals sources / Aquaculture/ Aquarium Fish Keeping	2	2	10	40	50
III	V	Paper - V	DSE-I Theory	Physiological Chemistry and Endocrinology/ Laboratory Animals Maintenance and Applications / Immunology and Animal Biotechnology	4	2	20	80	100
			DSE -I Practical	Physiological Chemistry and Endocrinology/ Laboratory Animals Maintenance and Applications / Immunology and Animal Biotechnology	1	2	10	40	50
			GE – I Theory	Preventive Medicine / Integrated Pest Management	4	2	20	80	100
	VI	Paper - VI	DSE-II Theory	Fisheries / Limnology / Ecology, Zoogeography and Evolution	4	2	20	80	100
			DSE-II Practical	Fisheries / Limnology / Ecology, Zoogeography and Evolution	1	2	10	40	50
				Project / Tools and Techniques in Biology	4	2	20	80	100
					46	**36**	**260**	**1040**	**1300**

DSC – Discipline Specific Core; **DSE –** Discipline Specific Elective; **SEC –** Skill enhancement Course; **GE-** Generic Elective (Open streams)

*Practical one credit equal to 3 hours of instruction

CHAIR MEN
Board of Studies in Zoology
Osmania University.

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 Nemathelminthes

2.3.1 General characters
2.3.2 Classification of Nemathelminthes 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

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"

B.Sc. ZOOLOGY I YEAR
ZOOLOGY PRACTICAL SYLLABUS FOR I SEMESTER
CORE PAPER – I
ANIMAL DIVERSITY – INVERTEBRATES

Instructions: 3hr per week
No. of credits: 1

1. **Study of museum slides / specimens / models (Classification of animals up to orders)**

i. **Protozoa:** Amoeba, *Paramoecium, Paramoecium Binary fission and Conjugation, Vorticella, Entamoeba histolytica, Plasmodium vivax*
ii. **Porifera**: *Sycon, Spongilla, Euspongia, Sycon* - T.S & L.S, Spicules, Gemmule
iii. **Coelenterata:** *Obelia – Colony & Medusa, Aurelia, Physalia, Velella, Corallium, Gorgonia, Pennatula*
iv. **Platyhelminthes:** *Planaria, Fasciola hepatica, Fasciola* larval forms – Miracidium, Redia, Cercaria, *Echinococcus granulosus, Taenia solium, Schistosoma haematobium*
v. **Nemathelminthes:** *Ascaris(Male & Female), Drancunculus, Ancylostoma, Wuchereria*
vi. **Annelida:** *Nereis, Aphrodite, Chaetopteurs, Hirudinaria,* Trochophore larva
vii. **Arthropoda:** Cancer, Palaemon, Scorpion, *Scolopendra, Sacculina, Limulus, Peripatus,* Larvae - Nauplius, Mysis, Zoea, Mouth parts of male & female *Anopheles* and *Culex,* Mouthparts of Housefly and Butterfly.
viii. **Mollusca:** *Chiton, Pila, Unio, Pteredo, Murex, Sepia, Loligo, Octopus, Nautilus,* Glochidium larva
ix. **Echinodermata:** *Asterias, Ophiothrix, Echinus, Clypeaster, Cucumaria, Antedon,* Bipinnaria larva

2. **Dissections:**

Prawn: Appendages, Digestive system, Nervous system, Mounting of Statocyst
Insect Mouth Parts

3. **Laboratory Record work shall be submitted at the time of practical examination**

4. An **"Animal album"** containing photographs, cut outs, with appropriate write up about the above mentioned taxa. Different taxa/ topics may be given to different sets of students for this purpose.

5. **Computer aided techniques should be adopted – show virtual dissections**

Suggested manuals:

1. Practical Zoology- Invertebrates S.S. Lal
2. Practical Zoology - Invertebrates P.S. Verma
3. Practical Zoology - Invertebrates K.P. Kurl

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

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.

B.Sc. ZOOLOGY SYLLABUS UNDER CBCS 2019-20

B.Sc. ZOOLOGY I YEAR
ZOOLOGY PRACTICAL SYLLABUS FOR II SEMESTER
ZOOLOGY - CORE PAPER - II
ANIMAL DIVERSITY- VERTEBRATES

Instructions: 3hr per week
No. of credits: 1

Study of museum slides / specimens / models (Classification of animals up to orders)

1. **Hemichordata:** *Balanoglossus,* Tornaria larva
2. **Protochordata:** *Amphioxus, Amphioxus* T.S. through pharynx
3. **Cyclostomata:** *Petromyzon, Myxine, Ammocoetus larva*
4. **Pisces:** Sphyrna *Pristis, Torpedo, Channa, Pleuronectes, Hippocampus, Exocoetus, Echieneis, Labeo, Catla, Clarius, Auguilla, Protopterus,* Scales: Placoid, Cycloid, Ctenoid
5. **Amphibia:** *Ichthyophis, Amblystoma, Siren, Hyla, Rachophous,Bufo,Rana,* Axolotal larva
6. **Reptilia :** *Draco, Chemaeleon, Gecko, Uromastix, Vipera russelli, Naja, Bungarus, Enhydrina, Typhlops, Testudo, Trionyx, Crocodilus, Ptyas.*
7. **Aves:** Archaeopteryx, *Passer, Psittacula, Bubo, Alcedo, Columba, Corvus, Pavo;* Collection and study of different types of feathers: Quill, Contour, Filoplume, Down
8. **Mammalia:** *Ornithorhynchus, Tachyglossus, Pteropus, Funambulus, Manis, Loris,* Hedgehog

Histology: T.S. of Liver, Pancreas, Kidney, Stomach, Intestine, Lungs Artery, Vein, Bone T.S., Spinal cord.

Osteology :

1. Rabbit – Axial skeleton system (bones of Skull and Vertebral Column)
2. Varanus, Pigeon and Rabbit – Appendicular skeleton system (bones of limbs and girdles)

Dissections of *Labeo/Tilapia*:

1. Digestive system.
2. Brain, Weberian ossicles
3. V, VII, IX, X cranial nerves

Laboratory Record work shall be submitted at the time of practical examination
An **"Animal album"** containing photographs, cut outs, with appropriate write up about the above mentioned taxa. Different taxa/ topics may be given to different sets of students for this purpose.

Computer aided virtual dissections.

Suggested manuals

1. **S.S.Lal,** Practical Zoology – Vertebrata
2. **P.S.Verma,** A manual of Practical Zoology – Chordata
3. **Freeman & Bracegirdle,** An atlas of embryology

B.Sc. ZOOLOGY SYLLABUS UNDER CBCS 2019-20

B.Sc. ZOOLOGY II YEAR
SEMESTER-III
CORE PAPER – III: ANIMAL PHYSIOLOGY AND ANIMAL BEHAVIOUR

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

UNIT – I: **(15 periods)**

1.1 Digestion

1.1.1 Enzymes: Definition, classification, inhibition, regulation.
1.1.2 Digestion of carbohydrates, proteins, lipids and cellulose
1.1.3 Absorption, assimilation of digested food
1.1.4 Role of gastrointestinal hormones in digestion

1.2 Excretion

1.2.1 Classification of animals on the basis of excretory products:Ammonotelic, Uricotelicand Ureotelic
1.2.2 Structure and function of nephron
1.2.3 Urine formation counter current mechanism

1.3 Osmoregulation

1.3.1 Water and ionic regulation by fresh water
1.3.2 Brackish water and marine water animals

UNIT – II: **(15 periods)**

2.1 Homeostasis

2.1.1 Concept of homeostasis
2.1.2 Mechanism of homeostasis

2.2 Respiration

2.2.1 Definition of respiration, respiratory mechanism, external, internal and cellular Respiration
2.2.2 Respiratory pigments, transport of oxygen, oxygen dissociation curves, Bohr's effect, transport of carbon dioxide, chloride shift
2.2.3 Regulation of respiration: nervous and chemical mechanism

2.3 Circulation

2.3.1 Types of circulation: open and closed:Structure of mammalian heart
2.3.2 Types of hearts: neurogenic and myogenic
2.3.3 Heart functions, conduction and regulation of heartbeat, regulation of heart rate
2.3.4 Tachycardia, bradycardia: blood clotting mechanism

UNIT – III: **(15 periods)**

3.1Muscle contraction

3.1.1 Types of muscles
3.1.2 Ultrastructure of skeletal musclefibre
3.1.3 Sliding filament theory of muscle contraction mechanism and energetics
3.1.4 Twitch tetanus summation,Treppe fatigue

3.2 Nerves

3.2.1 Structure of neuron
3.2.2 Resting potential, threshold potential, action potential, conduction of nerve impulse
3.2.3 Transmission of nerve impulse
3.2.4 Synapse, synaptic transmission neurotransmitters EPSP, IPSP

3.3 Endocrine systems

3.3.1 Endocrine glands- Structure, secretion, function of Pituitary, Thyroid, Parathyroid,Adrenal glands 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

UNIT – IV: **(15 periods)**

4.1 Animal behaviour

4.1.1 Types of behaviour and acquired instinctive behaviour

4.1.2 Behaviourtaxes, 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

4.3Social behaviour and communication:

4.3.1 Colonial existence of bees and termites, pheromones

4.4Biological 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*
2. *and Physiology*, Tenth Ed., John Wiley & Sons
3. **Arthur C. Guyton MD**, *A Text Book of Medical Physiology,* Eleventh ed., John
4. E. Hall, Harcourt Asia Ltd.
5. **William F. Ganong**, *A Review of Medical Physiology*, 22 ed, McGraw Hill, 2005
6. **Sherwood, Klandrof, Yanc,** *Animal Physiology*, Thompson Brooks/Coole, 2005.
7. **Sherwood, Klandrof, Yanc,** *Human Physiology*, Thompson Brooks/Coole, 2005.
8. **Knut Scmidt-Nielson,** *Animal Physiology*, 5th ed, Cambridge Low Price Edition.
9. **Roger Eckert and Randal,** *Animal Physiology*, 4th ed, Freeman Co, New York.
10. **Singh. H.R,** Text Book of Animal Physiology and Biochemistry
11. **Nagabhushanam** , Comparative Animal Physiology
    Veer Bal Rastogi, Text Book of Animal Physiology

B.Sc. ZOOLOGY SYLLABUS UNDER CBCS 2019-20

B.Sc. ZOOLOGY PRACTICAL SYLLABUS
SEMESTER-III
CORE PAPER – III: ANIMAL PHYSIOLOGY AND ANIMAL BEHAVIOUR

Instructions: 3hr per week
No. of credits: 1

1. Qualitative test of identification of carbohydrates, proteins and lipids.
2. Qualitative test of identification of ammonia, urea, uric acid (nitrogenous excretory products).
3. Zonation of gut in cockroaches.
4. Effect of pH and temperature on salivary amylase activity.
5. Study of permanent histological sections of mammalian endocrine glands: pituitary, thyroid, pancreas, adrenal glands.
6. Estimation of haemoglobin by Sahil's method.
7. Estimation of blood clotting time.
8. Estimation of total protein by Biuret's method.
9. Estimation of unit metabolism of fish.

- Laboratory record work shall be submitted at the time of practical examinations.
- Computer – aided techniques shall be adopted as per UGC guidelines.

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, sparing, 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, Mascow.
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.

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; propalic
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 aro IBH, New Delhi
3. Apiculture by Bisht, ICAR publication

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, ESI 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,
6. 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, Anylase, 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, peritomeal 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 Clincial diagnosis of non infection diseases – Diabetes, Hypertension, Asthama, Stroke, Arthritis, Heart attack, Cancer –bengin, Malignant metastasis
2.4 Concept of Edema, Hyperaemia, Haemorhage, Hemostais, Thrombosis, Cellular responses – Hyperplasia, Hypertrapy, Metaplasisa, 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 Pthology and bacterial and medical publisher.
4. Ramnik Sood, Medcial laboratory Technieques – Jaypee Brothers.
5. Prakash, G. Lab Manual on Blood Analysis and Medical Diagnostics, S. Chand and Co. Ltd.
6. Robbins and Cortra, 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 & DEVELOPMENTAL BIOLOGY

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

UNIT – I: **(15 Periods)**

1. Cell Biology

1.1. Ultrastructure of animal cell
1.2. Structure and functions of plasma membrane proteins.
1.3. Structure and functions of cell organelles –Endoplasmic reticulum, Golgi body, Ribosomes, Lysosomes, centrosomes, Mitochondria and Nucleus
1.4. Chromosomes – Structure, types, giant chromosomes
1.5. Cell Division - Mitosis, Meiosis; Cell cycle and its regulation.

UNIT – II: **(15 Periods)**

2. Molecular Biology

2.1 DNA (Deoxyribo Nucleic Acid) – Structure and RNA (Ribo Nucleic Acid) - Structure, types
2.2 DNA Replication
2.3 Protein Synthesis – Transcription and Translation
2.4 Gene Expression – Genetic Code; operon concept
2.5 Molecular Biology Techniques- Polymerase Chain Reaction, Electrophoresis

UNIT – III: **(15 Periods)**

3. Genetics

3.1 Mendals laws of Inheritance and Non-Medelian Inheritance
3.2 Linkage and Crossing over
3.3 Sex determination and sex-linked inheritance
3.4 Chromosomal Mutations- Deletion, Duplication, Inversion, Translocation, Aneuploidy and Polyploidy; Gene mutations- Induced versus Spontaneous mutations.
3.5 Inborn errors of metabolism.

UNIT – IV: **(15 Periods)**

4. Developmental Biology and Embryology

4.1 Gametogenesis (Spermatogenesis and Oogenesis) Fertilization; Types of eggs; Types of cleavages
4.2 Development of Frog up to formation of primary germ layers
4.3 Formation of Foetal membrane in chick embryo and their functions
4.4 Types and functions of Placenta in mammals
4.5 Regeneration in Turbellaria and Lizards

Suggested readings:

1. **Lodish, Berk, Zipursky, Matsudaria, Baltimore, Darnell** *'Molecular Cell Biology'* W.H. Free man and company New York..
2. **Gardner, E.J., Simmons, M.J., Snustad, D.P. (2008).** *Principles of Genetics*. VIII Edition. Wiley India.
3. **Snustad, D.P., Simmons, M.J. (2009).** *Principles of Genetics*. V Edition. John Wiley and Sons Inc.

4. **Klug, W.S., Cummings, M.R., Spencer, C.A. (2012).** *Concepts of Genetics*. X Edition. Benjamin Cummings.
5. **Russell, P. J. (2009).** *Genetics- A Molecular Approach.* III Edition. Benjamin Cummings.
6. **Griffiths, A.J.F., Wessler, S.R., Lewontin, R.C. and Carroll, S.B.** *Introduction to Genetic Analysis.* IX Edition. W. H. Freeman and Co.
7. **Gupta P.K.**, 'Genetics'
8. Developmental Biology by **Berryl**
9. Developmental Biology **S. Gilbert**
10. Developmental Biology - patterns, problems and principles by **W. Saunders Jr.**

B.Sc. ZOOLOGY SYLLABUS UNDER CBCS 2019-20

B.Sc. ZOOLOGY II YEAR PRACTICAL SYLLABUS
SEMESTER - IV
CORE PAPER – IV
CELL BIOLOGY, GENETICS & DEVELOPMENTAL BIOLOGY

Instructions: 3hr per week
No. of credits: 1

I. Cytology

1. Preparation and Identification of slides of Mitotic divisions with onion root tips
2. Preparation and Identification of different stages of Meiosis in Grasshopper Testes
3. Identification and study of the following slides
   i). Different stages of Mitosis and Meiosis
   ii) Lamp brush and Polytene chromosomes

II. Genetics

1. Problems on Genetics - Mendelian inheritance, Linkage and crossing over, Sex linked inheritance

III. Embryology

1. Study of T.S. of Testis and Ovary of a mammal
2. Study of different stages of cleavages (2, 4, 8, 16 cell stages); Morula, Blastula
3. Study of chick embryos of 18 hours, 24 hours, 33 hours and 48 hours of incubation

Laboratory Record work shall be submitted at the time of practical examination

An **"Album"** containing photographs, cut outs, with appropriate write-up about Genetics and Evolution.

Computer aided techniques should be adopted as per UGC guide lines.

Suggested manuals

1. Manual of laboratory experiments in cell biology Edward, G.
2. **Freeman & Bracegirdle,** An atlas of embryology