- https://lanwebs.lander.edu/faculty/rsfox/invertebrates/
- http://www.zoologyresources.com/uploadfiles/books/dc64b77d8769325515d17c945e461b45.pdf

******

SEMESTER-III

COURSE 2: ANIMAL DIVERISTY-II BIOLOGY OF CHORDATES

Theory Credits: 3 3 hrs/week

LEARNING OBJECTIVES

- To understand the animal kingdom.
- To understand the taxonomic position of Protochordata to Mammalia.
- To understand the general characteristics of animals belonging to Fishes to Reptilians.
- To understand the body organization of Chordata.
- To understand the taxonomic position of Protherian mammals.

LEARNING OUTCOMES: By the completion of the course the graduate should able to –

- Describe general taxonomic rules on animal classification of chordates
- Classify Protochordata to Mammalia with taxonomic keys
- Understand Mammals with specific structural adaptations
- Understand the significance of dentition and evolutionary significance
- Understand the origin and evolutionary relationship of different phyla from Prochordata to Mammalia.

SYLLABUS:

UNIT - I

1.1 General characters and classification of Chordata up to classes
1.2 Salient features of Cephalochordata, Salient features of Urochordata
1.3 Structure and life history of *Herdmania*, Retrogressive metamorphosis –Process and Significance
1.4 Cyclostomata, General characters, Comparison of Petromyzon and Myxine

Activity: Model preparation /Assignment /Students Seminar/Quiz/Project/Peer teaching/Report writing after watching any video on the above
Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity

UNIT - II

2.1 General characters of Fishes, Salient features Dipnoi
2.2 *Scoliodon*: External features, Digestive system, Respiratory system
2.3 *Scoliodon* Structure and function of Heart, Structure and functions of the Brain.
2.4 Migration in Fishes, Types of Scales

Activity: Model preparation /Assignment /Students Seminar/Quiz/Project/Peer teaching/Report writing after watching any video on the above
Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity

UNIT - III

3.1 General characters of Amphibia, General characters of Reptilia
3.2 *Rana hexadactyla*: External features, Respiratory system, Structure and function of Heart
3.3 *Rana hexadactyla* structure and functions of the Brain
3.4 *Calotes*: External features, Digestive system, structure and function of Brain
3.5 Identification of Poisonous snakes

Activity: Model preparation /Assignment /Students Seminar/Quiz/Project/Peer teaching/Report writing after watching any video on the above
Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity

UNIT - IV

4.1 General characters of Aves
4.2 *Columba livia*: External features, Digestive system, Respiratory system
4.3 *Columba livia*: Structure and function of Heart, structure and function of Brain
4.4 Migration in Birds, Flight adaptation in birds

Activity: Model preparation/Assignment /Students Seminar/Quiz/Project/Peer teaching/Report writing after watching any video on the above
Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity

UNIT - V

5.1 General characters of Mammalia
5.2 Classification of Mammalia up to sub - classes with examples
5.3 Comparison of Prototherians, Metatherians and Eutherians
5.4 Dentition in mammals, Aquatic mammals Adaptations

Activity: Model preparation/Assignment /Students Seminar/Quiz/Project/Peer teaching/Report writing after watching any video on the above
Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity

Co-curricular activities (suggested)

- Preparation of charts on Chordate classification (with representative animal photos) and retrogressive metamorphosis
- Clay models of Herdmania and Amphioxus
- Visit to local fish market and identification of local cartilaginous and bony fishes
- Maintaining of aquarium by students
- Model of fish heart and brain
- Preparation of slides of scales of fishes
- Visit to local/nearby river to identify migratory fishes and prepare study notes
- Preparation of Charts on above topics by students (Eg: comparative account of vertebrate heart/brain/lungs, identification of snakes etc.)

- Collecting and preparation of Museum specimens with dead frogs/snakes/lizards etc., and/or their skeletons
- Additional input on types of snake poisons and their antidotes (student activity).
- Collection of bird feathers and submission of report on Plumology
- Taxidermic preparation of dead birds for Zoology Museum
- Map pointing of prototherian and metatherian mammals
- Chart preparation for dentition in mammals

REFERENCE BOOKS

- J.Z. Young, 2006. The life of vertebrates. (The Oxford University Press, New Delhi). 646 pages. Reprinted
- Arumugam, N. Chordate Zoology, Vol. 2. Saras Publication. 278 pages. 200 figs.
- A.J. Marshall, 1995. Textbook of zoology, Vertebrates. (The McMillan Press Ltd., UK). 852 pages. (Revised edition of Parker &Haswell, 1961).
- M. Ekambaranatha Ayyar, 1973. A manual of zoology. Part II. (S. Viswanathan Pvt. Ltd., Madras).
- P.S. Dhami & J.K. Dhami, 1981. Chordate zoology. (R. Chand & Co.). 550 pages.
- Gurdarshan Singh & H. Bhaskar, 2002. Advanced Chordate Zoology. Campus Books, 6 Vols., 1573 pp., tables, figs.
- A.K. Sinha, S. Adhikari& B.B. Ganguly, 1978. Biology of animals. Vol. II. Chordates. (New Central Book Agency, Calcutta). 560 pages.
- R.L. Kotpal, 2022. Modern textbook of zoology, Vertebrates. (Rastogi Publ., Meerut). 632 pages.
- E.L. Jordan & P.S. Verma, 1998. Chordate zoology. (S. Chand & Co.). 1092 pages.
- G.S. Sandhu, 2005. Objective Chordate Zoology. Campus Books, vii, 169 pp.
- Sandhu, G.S. & H. Bhaskar, H. 2004. Textbook of Chordate Zoology. Campus Books, 2 vols., xx, 964 p., figs.
- Veena, 2008. Lower Chordata. (Sonali Publ.), 374 p., tables, 117 figs.

******

SEMESTER-III

COURSE 2: ANIMAL DIVERISTY-II BIOLOGY OF CHORDATES

Practical Credits: 1 2 hrs/week

LEARNING OBJECTIVES

- To understand the importance of preservation of museum specimens
- To identify animals based on special identifying characters
- To understand different organ systems through demo or virtual dissections
- To maintain a neat, labeled record of identified museum specimens

SYLLABUS:

1. Protochordata: *Herdmania, Amphioxus, Amphioxus* T.S through pharynx.
2. Cyclostomes: *Petromyzon and Myxine.*
3. Pisces: *Pristis, Torpedo, Hippocampus, Exocoetus, Echeneis, Labeo, Catla,Clarius, Channa, Anguilla*.
4. Amphibia: *Ichthyophis, Amblystoma, Axolotl larva, Hyla,*
5. Reptilia: *Draco, Chamaeleon, Uromastix, Testudo, Trionyx, Russels viper, Naja,* Krait, *Hydrophis, Crocodile.*
6. Aves: *Psittacula, Eudynamis, Bubo, Alcedo.*
7. Mammalia: *Ornithorhynchus, Pteropus, Funambulus.*
8. **Dissections**-As per UGC guidelines
   Scoliodon IX and X, Cranial nerves
   Scoliodon Brain
   Mounting of fish scales

Note: 1. Dissections are to be demonstrated only by the faculty or virtual.
2.Laboratory Record work shall be submitted at the time of practical examination.

RFERENCE WEB LINKS:

- https://nt7-mhe-complex-assets.mheducation.com/nt7-mhe-complex-assets/Upload-20190715/InspireScience6-8CA/LS15/index.html
- https://themammallab.com/
- http://abacus.bates.edu/acad/depts/biobook/LabConCh.htm
- https://virtualzoology.wordpress.com/scoliodon/
- http://www.zoologyresources.com/uploadfiles/books/dc64b77d8769325515d17c945e461b45.pdf

******