General Objectives

- To make the M. Sc. Programme in Zoology more practical and relevant to the professional needs as required by the country.
- To provide the students with advanced knowledge in the area of specialization and upgrading the quality so that M.Sc. students in Zoology could compete academically with other universities of the international level.

Semester I

**Course Title: Taxonomy & Lower Non-Chordates**
Course No: Zoo 501
Nature of the course: Theory

**Credits: 3**
Lecture hrs: 45
Full marks: 75
Pass marks: 37.5

Objectives

- To help knowing the basic concept of biosystematics and procedures in taxonomy.
- To know about some of the important and common protozoans and helminthes of parasitic nature causing diseases in Nepal.
- To make able to discuss some of the important phenomena in Lower-chordates.

Course Contents


**Porifera:** Classification. Origin. Affinities.

**Cnidology:** Classification. Nematocysts. Mesenteries in Anthozoa. Corals: Growth, theories of formation and importance.

References


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Course Title: Higher Non-Chordates and Lower Chordates
Course No: Zoo 502
Nature of the course: Theory

Credits: 3
Lecture hrs: 45
Full marks: 75
Pass marks: 37.5

Objectives

• To identify the taxonomic status of the higher non-chordates and discuss the evolutionary model of the group.

• To describe the general biology of a few selected non-chordates useful to mankind.

• To make able to discuss some of the important phenomena in higher non-chordates.

Course Contents


Echinodermata: Classification. Larval forms and symmetry. Skeletal system. Origin and Evolution. 5 hrs

Minor Phyla: Salient features of Acanthocephala, Nemartina, Nematomorpha, Rotifera, Gastrotricha, Bryozoa (Ectoprocta), Entoprocta, Mesozoa, Ctenophora and Brachiopoda. 6 hrs

Lower Chordata. Origin, evolution and phylogeny of lower chordate to higher chordate. 5 hrs

References


Course Title: Higher Chordates
Course No: Zoo 503
Nature of the course: Theory

Credits: 3
Lecture hrs: 45
Full marks: 75
Pass marks: 37.5

Objectives

- To identify the taxonomic status of the chordates and discuss the evolutionary model of the group.
- To impart knowledge on ecology of some important fishes, amphibians, reptiles, birds and mammals of Nepal.
- To make able to discuss some of the important phenomena in chordata.
- To know about the conservation and management strategies of the chordate fauna in Nepal.

Course Contents


**Herpetology:**


References


Snow Leopard Network websites


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Course Title: Comparative Anatomy & Physiology          Credits: 3
Course No: Zoo 504                                    Lecture hrs: 45
Nature of the course: Theory                          Full marks: 75
                                                        Pass marks: 37.5

Objectives

- To impart knowledge in comparative anatomy and development systems of chordates.
- To make familiar with the functions of different organs of human body.
- To provide an understanding of currently established interdisciplinary approaches used in the study of animal physiology.

Course Contents

**Comparative Anatomy:** Integument, Digestive organs, Respiratory organs, Heart, Aortic Arches, Brain and Urino-genital organs of Vertebrates. 12 hrs

**Animal Physiology:**

- **Gastro-intestinal:** Principles of digestion and absorption of nutrients. Gastro-intestinal disorders. 3 hrs
- **Respiratory:** Respiratory pigments- structure, properties and functions. Regulation of respiration. Respiratory abnormalities (Hypoxia, Dyspnoea, Asthma, Edema, Emphysema). 7 hrs
- **Cardio-vascular:** Cardiac cycle. Cardiac output. Regulation of heart pumping and pacemaker. Heart valves and valvular diseases. Regulation of arterial and venous blood flow. Regulation of blood pressure. 5 hrs
- **Excretory and Osmoregulatory:** Homeostatic and Osmoregulatory functions of the vertebrate kidney. Abnormalities of micturition. Diuretic and Kidney diseases (Acute Renal Failure). 3 hrs
- **Reproductive:** Gametogenesis. Hormones in Ovulation (Ovarian cycle) and Menstruation (Uterine cycle). 3 hrs
- **Endocrinology:** Endocrine glands and their hormones. Hypothalamo-hypophysial system. Regulation of hormone. 6 hrs

References

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Objective

For better understanding of the topics of Zoo 501 and 502.

Course Contents

**Study of microscopic animals:** Culture of different protozoans and preparation of their permanent slides. Identification, drawing of the prepared permanent and temporary slides.

**Micrometry:** Measurement of microscopic objects using micrometer.

**Study of animal parasites of vertebrates** (Ecto and Endo both): Ticks, mites, helminthes and their identification up to family level.

**Insect rearing:** Rearing of any member of a holometabolous and hemimetabolous insect in the laboratory and make recordings on their life cycle (a caterpillar/ a bug).

Extraction of soil fauna (using funnel method) and identification of any five soil arthropod and nematode species.

**Dissection and Slide preparation:** Dissection of annelids and arthropods (crustaceans, insects commonly available preferably pest species such as grasshoppers, beetles, etc.) - Alimentary Canal, Reproductive Organs, Nervous system. Preparation of permanent slides of at least two different mouth parts of insects.

Dissection of molluscs (slug species, terrestrial snails including pest species such as *Lissachatina fulica*, *Bensonia*, *Macrochlamys* etc) - Alimentary Canal, Reproductive Organs. Permanent slide preparation of jaws, radula of the dissected snail or slug.

**Museum and Zoo visit:** Study of animals in the museums (CDZ, NHM, NARC), learning techniques, prepare report on any one species or group of animals about current situation of that group or species.

**Collection and Identification:** Collection and Preservation techniques of different animals. Handling of specimens. Each student must follow the standard techniques provided by teachers. Collection, Curation, Identification and Deposition of the animals.
Course Title: Chordate, Comp.Anat.& Physio.  
Course No: Zoo 506  
Nature of the course: Practical  
Credit: 2  
No. of Practicals: 30  
Full marks: 50  
Pass marks: 25

Objective

For better understanding of the topics of Zoo 503 & 504.

Course Contents

Taxidermi: Study of preservation media and tools and materials for Taxidermi. Stuffing of (1) Frog, (2) Lizard, (3) Bird and (4) Mammal of any type.

Osteology: Preparation and study of bones of fish, amphibians, reptiles, birds, and small mammals.


Histological Studies: Identification of cross sections of chick embryo through eye, ear, heart. Study of different types of placenta in mammals available in slides or others. Preparation of histological slides of tissues of different animals by using microtomy.

Comparative Anatomy: Comparative study of different organ-systems of different vertebrates.

Physiology: Test of carbohydrate (Mollisch’s test, Barfoed’s test, Benedict’s tests, Fehling’s test, Iodine test), protein (protein precipitation, ninhydrin reaction, biuret reaction, Xanthoproteic reaction) and lipids (solubility test, reaction with sudan IV, Saponification, Dunstan’s test). Determination of the total number of human red and white blood cells in cubic millimeter. Estimation of urea, sugar, protein in urine. Glycogen estimation from animal tissues. Measurement of the rate of muscle contraction and relaxation using kymograph.

Museum visit: Preparation of report on the museum visit on any group of animal and species.


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