MASTER OF SCIENCE
ZOOLOGY

INTRODUCTION

The Department of Biological Sciences (College of Science) offers a Master of Science program in **Zoology**. Only full-time students are admitted to this program. The program is designed to prepare individuals for a variety of career opportunities. These include further education, a leadership role in secondary school education, employment in government or private sector laboratories, technically oriented positions in government or business and in environmental conservation. The discipline Zoology currently offers courses and research opportunities in several main fields. These include: Marine Biology/Ecology, Desert Biology/Ecology, Parasitology, Reproductive Biology, Genetics, Animal Behaviour, Embryology and Physiology.

According to the University Council decision dated 4/2/2007, Thesis students admitted with effect from September 2007 are exempted from the comprehensive examination.

PROGRAM REQUIREMENTS

The program requirements are:

30 TOTAL COURSE CREDITS

9 COMPULSORY (3 credits each)

0493-501 Retrieval, Interpretation and presentation of Zoological Data
0493-502 Principles of Taxonomy
0493-503 Reproductive Biology

3 PARTIALLY ELECTIVE (3 credits each):

0493-504 Marine Biology/Ecology
0493-505 Desert Biology/Ecology

9 ELECTIVES* (3 credits each)

0493-504 Marine Biology/Ecology
0493-505 Desert Biology/Ecology
0493-511 Parasitology
0493-512 Animal Behaviour
0493-513 Physiology
0493-514 Embryology
0493-515 Malacology
0493-516 Molecular Genetics

*****The graduate students will be allowed to take 6 credit hour courses from different disciplines of the Department of Biological Sciences. **The student can only take these courses with the approval of the thesis supervisor.**

The graduate students in the Department of Biological Sciences will be allowed to take three credit hour course/s in Medical/Science faculty **with the approval of thesis supervisor.**

9 COMPULSORY (Thesis)

0493-597 (0)
0493-598 (0)
2000-599 (9)

COURSE DESCRIPTION

0493-501: RETRIEVAL, INTERPRETATION AND PRESENTATION OF ZOOLOGICAL DATA
CR: 3

A course based on all literary aspects of Zoology involving both formal instruction and set exercises covering the following topics: (a) Search techniques (abstract journals; computer search by key words; journal selection; world-lists of periodicals and inter-library loan systems). (b) Processing of papers in different languages: translation services and selection of important data. (c) Application of statistical methods in the interpretation and presentation of data including the re-evaluation of published data. (d) Establishing a personal filing system for references. (e) Writing of scientific papers including guidance on the preparation and presentation of art work. (f) Oral presentation of data and proper use of visual aids.

0493-502: PRINCIPLES OF TAXONOMY
CR: 3

The role of taxonomy in Biology. Hierarchy and systematic units; phena, taxa, and categories. The species problem and definitions. Infra specific units; monotypic and polytypic species; allopatric and sympatric species; sibling species; biological and host races; the cline; sub-species and geographical races. Genus and higher units. Theories of biological classification: essentialism, nominalism, empiricism, cladism...etc. Newer approaches: Cytotaxonomy; Biochemical and Immunological Taxonomy; "quantitative taxonomy"; monethetic and polythetic groups; population taxonomy. Zoological nomenclature: Briet history; the "code"; the "law of priority", and the type concept. Sound taxonomic procedures. Systematic notations.

0493-503: REPRODUCTIVE BIOLOGY
CR: 3

Biology of gametes. Gametogenesis in seasonal and non-seasonal animals utilising examples from local fauna. Influence of circadian, semi- lunar and lunar rhythms. Physiology of sperm motility and the structure of the axonome. Immunological aspects. Endocrine system and reproduction-positive and negative-feedback systems. Hypothalamus and FSH-LH releasing factor. Roles of FSH and LH. Biosynthesis of steroid hormones; effects of steroid hormones on target tissues in the reproductive system. In both the theory and practical parts of the course, the opportunity is taken to expose the student to the principles and practice of modern techniques of wide application including phase and differential interference contrast microscopy; transmission, scanning and analytical electron microscopy; chromatography; use of radio isotopes and photographic techniques at the micro and macro levels.

0493-504: MARINE BIOLOGY/ECOLOGY
CR: 3

A course consisting of two main parts: (a) Adaptive radiation in marine organisms and (b) Economic aspects. In the first part, emphasis will be placed on the principal factors involved in adaptive radiation including choice of habitat, selection pressure and the physiological and anatomical features of animals living in such habitats. The second part will be mainly concerned with recent advances in fisheries and mariculture including the economic effects of pollution. The course includes laboratory and field exercises on the local marine fauna.

0493-505: DESERT BIOLOGY/ECOLOGY
CR: 3

An advanced course concerned with the study of the desert ecosystem as a functional unit. Emphasis will be on the community structure, diversity, population dynamics of desert fauna and flora physiological and ecological adaptations for life in the desert. Field exercises and laboratory experiments will be based on the local fauna and flora.

0493-511: PARASITOLOGY
CR: 3

A course consisting of two main parts: (a) Theoretical aspects of parasitology in general (b) Special study of certain parasites or groups of parasites. The theoretical aspects include: Parasites and degrees of animal associations; host-parasite relationships; immunological aspects; types of life-cycles and hosts; zoonosis; ecological aspects of parasitism; parasitocoenosis; the immediate environment; distribution of parasites and parasite-host specificity; behavioural aspects of parasitism; evolution of parasitism.

0493-512: ANIMAL BEHAVIOUR
CR: 3

A course consisting of two main sections: (a) Concepts in animal behaviour and (b) Behaviour in particular group of groups of animals. Concepts in animal behaviour include: The organisation of animal behaviour; animal communication; neural and hormonal aspects; evolution and survival value of behaviour. For (b) above, course participants will be required to review an area of research and identify and experiment on a problem which remains to be solved.

0493-513: PHYSIOLOGY
CR: 3

The course presents an advanced study of selected topics in physiology which emphasize problems pertaining to marine and desert animal. These topics include: respiratory pigments and their distribution; O_2 consumption, its modifying agents and regulation; metabolism as regulated to environmental oxygen; nitrogen excretion and its relation to availability of water; osmotic and ionic regulation and physiological problem of heat and water in desert animals, and temperature regulation in poikilothermic and homeothermic animals.

0493-514: EMBRYOLOGY
CR: 3

An advanced study of selected topics of special interest in developmental biology, such as: development in lower animals, morphogenesis in the protozoa and developmental problems in some invertebrate examples. Problems of differentiation, gene regulation and ontogenetic development. Differential gene activity during differentiation. Embryonic induction. Effects of environment in differentiation. The experimental approach in the study of developmental biology. Differentiation in regulation. Tissue culture. transplantations. Cell Fusion. Cloning.

0493-515: MALACOLOGY
CR: 3

A course, consisting of two main parts: (a) General Malacology and (b) Applied aspects. The first part includes a general review of the Phylum Mollusca and a systematic description of its major classes. The evolution of various functions and organ systems within the phylum and the relationships between and within the different classes. Ecology, behaviour and adaptations of various marine, freshwater and terrestrial molluscs. Recent systems for classification and nomenclature of molluscs. The second part includes a study of the role played by certain molluscs as intermediate hosts for parasitic diseases of man and domestic animals, and of molluscs of commercial value and economic importance. The practical work includes laboratory studies of the morphology and biology of selected

examples of various molluscs as well as field and laboratory exercises on methods of collection, preservation and identification of common molluscs of the local fauna.

0493-516: MOLECULAR GENETICS
CR: 3

Genome structure in prokaryotes and enkaryotes. Molecular organization of nucleosomes and chromosomes. Gene expression and its regulation. Mutations and recombination at molecular level. Plesmids, transposable genetic elements and principle of recombinant DNA technology.

0493-597: THESIS
CR: 0

0493-598: THESIS
CR: 0

2000-599: THESIS
CR: 9