ZOOLOGY AND ENTOMOLOGY

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Distinguished Professor of Zoology and NRF Research Chair
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MH Villet, PhD(Wits), PGDHE(Rhodes)
SG Compton PhD(Hull)
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AN Hodgson, BSc(Liverpool), PhD(Manchester), DSc(Manchester), FRSSAf
Associate Professor (Zoology)
NB Richoux, PhD (Memorial, Canada)
Senior Lecturer (Zoology)
DM Parker, PhD(Rhodes)
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ULP Heshula, BSc(Hons)(UFH), PhD(Rhodes)
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Zoology (ZOO) is a six-semester subject which may be taken as a major subject for the degrees of BSc, BCom and BJourn.

Entomology (ENT) is a four-semester subject which may be taken as a major subject for the degrees of BSc and BJourn.

To major in Zoology, a candidate is required to obtain credit in the following courses: CHE 1; CEL 101; ZOO 101; BOT 102; ZOO 201; ZOO 202; ZOO 301, ZOO 302.

To major in Entomology, a candidate is required to obtain credit in the following courses: CHE 1; CEL 101; ZOO 101; BOT 102; ENT 201; ENT 202; ENT 301; ENT 302.

Two, or in some cases four, semester-credits in Zoology are allowed as credits for degree/diploma curricula in the Faculties of Humanities and Education.

Detailed information on course structures and the types of curricula involving Zoology or Entomology is available from the Head of Department.

See the Departmental web page http://www.ru.ac.za/zoologyandentomology for further details, particularly on the contents of courses.

Students are required to attend all official field trips which form part of any semester-course for which they are registered.

First-year level courses in Zoology
There are two first-year courses in Zoology. CEL 101 is normally held in the first semester and ZOO 101 in the second semester. Credit may be obtained in each course separately and, in addition, an aggregate mark of at least 50% will be deemed to be equivalent to a two-credit course ZOO 1 (or BIO 1, for Pharmacy students), provided that a candidate obtains the required sub-minimum (45%) in each component. However, students wishing to major in Zoology and/or Entomology must normally obtain credit in both components separately. Supplementary examinations may be awarded in either course, provided that a candidate achieves 35% in semester 1 and 45% in semester 2.

Adequate performance (in the form of at least a DP) for CEL 101 is required before a student may register for ZOO 101.

CEL 101: Cell Biology
This course compares cell structure in prokaryotic and eukaryotic cells, and examines cellular processes including cell to cell communication, photosynthesis and cell respiration. Cell division, fundamental genetics, including the structure of genetic material and how it controls cellular processes are also covered.

ZOO 101: Animal Diversity, Structure and Function
This course provides an introduction to the evolution, systematics, structure and functional biology of the animal kingdom, both vertebrate and invertebrate.

Second-year level courses in Zoology
There are two independent second-year courses in Zoology, ZOO 201 and ZOO 202.. Credit may be obtained in each course separately and, in addition, an aggregate mark of at least 50% will be deemed to be equivalent to a two-credit course ZOO 2, provided that a candidate obtains the required subminimum in each component. No supplementary examinations will be offered for either course.

Practical reports, essays, seminars and class tests collectively comprise the class mark, which forms part of the final mark.

When the intention is to major in Zoology, credit in Zoology (CEL 101, ZOO 101) Botany (BOT 102), and Chemistry (CHE 1) is normally required before a student may register for ZOO 201 or ZOO 202. Permission may be granted to repeat CHE 1 or BOT 102 concurrently with ZOO 201 and ZOO 202. Adequate performance (at least 45%) in the first semester is required before a student may register for the second semester.

ZOO 201: Principles of Ecology and Evolution
This course concerns the general principles of ecology, micro- and macro-evolution. Topics covered include niche theory, biogeography, species interactions, succession and disturbance, biodiversity and evolution.

ZOO 202: Environmental and Behavioural Physiology
This course examines the effects of environmental variables such as oxygen, carbon dioxide, ions, water, temperature, and other external stimuli on how animals function and how different groups of animals respond to different environmental conditions and stimuli.

Second-year level courses in Entomology
There are two independent second-year courses in Entomology, ENT 201 and ENT 202. Credit may be obtained in each course separately and, in addition, an aggregate mark of at least 50% will be deemed to be equivalent to a two-credit course ENT 2, provided that a candidate obtains the required subminimum in each component. No supplementary examinations will be offered for either course.

Practical reports, essays, seminars and class tests collectively comprise the class mark, which forms part of the final mark.

When the intention is to major in Entomology, credit in Zoology (CEL 101, ZOO 101), Botany (BOT 102), and in Chemistry (CHE 1) is normally required before a student may register for ENT 201 or ENT 202. Permission may be granted to repeat CHE 1 or BOT 102 concurrently with ENT 201 and ENT 202. Adequate performance (at least 40%) in the first semester is required before a student may register for the second semester.

ENT 201: Professional Entomology: Insects and Man
This course provides an overview of the biology of the major insect orders and their impact on humans, particularly in the context of major entomology career pathways such as agricultural entomology, medical and veterinary entomology, pesticides and biological control, aquatic entomology and biomonitoring. Practicals will be both field- and laboratory-based, and students must submit an insect collection.

ENT 202: General Insect Biology
This course provides an introduction to the anatomy, physiology, genetics, population biology, diversity, phylogeny, and conservation of insects. Practicals will be both field- and laboratory-based and students must submit an insect collection and attend short weekend field trips.

Third-year level courses in Zoology
There are two independent third year courses in Zoology. A student wishing to major in Zoology must obtain credit in ZOO 301 and ZOO 302. Credit may be obtained in each of these courses separately. Aggregation will be deemed equivalent to a two credit course ZOO 3, provided the candidate obtains the required subminimum in each semester. No supplementary examinations are offered in third year courses. Practical reports, essays, seminars and class tests collectively comprise the class mark, which forms part of the final course mark. A research project, which is carried out during the year, forms a component of each semester in Zoology. The project mark for the first semester will be based on a midyear report. Students who register for one semester only either undertake a shorter project or write an extended essay. The examination may include an

oral examination at the discretion of the examiners. When the intention is to major in Zoology, credit in ZOO 201 and ZOO 202 is required before a student may register for a third-year semester. Adequate performance (at least 45%) in the first semester is required before a student may register for the second semester.

ZOO 301: African Zoology: land animals and life histories
This course uses the African vertebrate fauna to illustrate the principles of behavioural and physiological adaptation to terrestrial habitats. An introductory section on African biogeography is followed by an examination of the problems and solutions associated with life in particular environments. These include arid habitats, montane and forest habitats and grasslands/savanna. A short field trip may be held.

ZOO 302: Marine Biology
The oceans have a profound effect on life on earth, providing food for man and influencing both weather and climate. This course emphasises the physical properties of the marine environment and how these shape species' interactions and food webs. Topics covered include ocean circulation, primary production, ecology of the deep sea, rocky shores, sandy beaches and estuaries, planktonic food webs and pelagic/demersal fisheries, and the behavioural and physiological ecology of intertidal invertebrates.

Third-year level courses in Entomology
There are two independent third year courses in Entomology. A student wishing to major in Entomology must obtain credit in ENT 301 and ENT 302. Credit may be obtained in each of these courses separately. Aggregation will be deemed equivalent to a two credit course ENT 3 provided the candidate obtains the required subminimum in each semester. No supplementary examinations are offered in third year courses. Practical reports, essays, seminars and class tests collectively comprise the class mark, which forms part of the final course mark. A research project, which is carried out during the year, forms a component of each semester in Entomology. The project mark for the first semester will be based on a mid-year report. Students who register for one semester only either undertake a shorter project or write an extended essay. The examination may include an oral examination at the discretion of the examiners.

When the intention is to major in Entomology, credit in ENT 201 and ENT 202 is required before a student may register for a third-year semester. Adequate performance (at least 45%) in the first semester is required before a student may register for the second semester.

ENT 301: Applied Insect Ecology
This course illustrates the application of ecological theory to applied problems in, for example, agricultural entomology, apiculture, weed biocontrol and forensic entomology.

ENT 302: Environmental Entomology
This course investigates the role of insects in the environment and covers aspects of conservation entomology, biological monitoring and aquatic entomology.

Honours in Zoology and Entomology
The Department offers separate Honours courses in Zoology, Entomology, Marine Biology, and African Vertebrate Biodiversity. The aim of these courses is to produce graduates who think in an analytical and critical way and who are capable of independent research, from project planning and experimental design to scientific writing. Students participate in core courses of statistics, scientific writing and philosophy of science, global ecology and evolution, and undertake a series of seminars, two major projects and a number of content-based courses. Whenever possible, students undertake a major field trip and attend a local scientific conference. Details of each Honours course are presented below. Joint honours with cognate disciplines may be permitted at the discretion of the heads of departments concerned.

Zoology Honours
The content-based courses include special topics in animal reproduction and life histories, animal behaviour, disturbance ecology, evolutionary biology, invasion biology, and applied zoology. Candidates undertake two research projects in any field of Zoology.

Entomology Honours
The course consists of advanced studies in Entomology, with special emphasis on insect ecology, economic entomology, biological control, biological invasions. Candidates undertake two entomological research projects.

Marine Biology Honours
Candidates should have either Botany, Zoology or Ichthyology as major BSc subjects (exceptions may be made at the discretion of the Head of Department). The course consists of advanced studies in Marine Biology, with special emphasis on physical/chemical oceanography, planktonic food webs, benthic food webs, fringing communities, and life history strategies. Candidates undertake two marine biological research projects. This course may involve a 4-6 week field trip to sub-Antarctic Marion Island, and /or other trips to sea.

African Vertebrate Biodiversity Honours
This course will focus on the principles that underpin sustaining vertebrate biodiversity in Africa. The course consists of advanced studies in vertebrate biology with emphasis on biogeography and biodiversity, population processes and life history patterns, physiological adaptations, and conservation and management. There is a strong practical component, in which students get field experience in ornithology and mammalogy. Candidates undertake two vertebrate research projects. There will normally be at least two week-long field trips in a local game reserve.

Master's and Doctoral degrees
Suitably qualified students are encouraged to proceed to the research degrees of MSc and PhD under the direction of the staff of the Department. Requirements for the MSc and PhD degrees are given in the General Rules.