

**DEPARTMENT OF ZOOLOGY  
FACULTY OF SCIENCE  
OBAFEMI AWOLOWO UNIVERSITY  
ILE-IFE**

**REVIEW OF POSTGRADUATE DEGREE PROGRAMME IN ZOOLOGY**

**1. BACKGROUND**

The Department of Zoology, Obafemi Awolowo University, Ile-Ife, which was established in 1962 currently offers an undergraduate degree programme in Zoology. The Department's current proposal of another undergraduate programme in Animal Ecology and Conservation is awaiting Senate's approval. The Department is presently equipped to offer postgraduate training in Ecology, Entomology, Genetics, Physiology, Fisheries, Limnology/Hydrobiology, Parasitology and Vertebrate Biology. To date, the Department has produced hundreds of graduates at both undergraduate and postgraduate levels who are serving this country creditably in both private and public establishment.

**2. JUSTIFICATION**

The first postgraduate programme was introduced in the late 60's with the first set of M.Sc degree holders produced in 1968 session. The first version of the PG programme was reviewed about two decades ago with the current version of the programme. The programme has produced several M.Sc.s and Ph.D.s into the nation's economy especially in the Teaching, Research, Education and Industrial Sectors. The Department, in response to the desire to continuously improve the quality of the graduates, faced with greater challenges of solving the nation's environmental problems, decided to urgently review the current PG program. It is in this light that the Department feels encouraged to once again respond positively by fundamentally reworking the course contents of the existing courses by streamlining and reviewing them. Also, the various research options available to postgraduate students have been strengthened with new courses in line with the current national challenges.

### 3. **OBJECTIVES**

The main objective of the postgraduate programme is to produce postgraduate students in Zoology whose training will enable them to deal with the increasingly specialized areas of the subject and whose intellectual accomplishments and mental perspectives will prepare them to operate on a broader level outside their areas of specialization.

The specific objectives of the programme is to:

- (i) produce well equipped graduates to pursue Zoology as a career in academics and in the industry
- (ii) respond to the shortage of skilled Zoology graduates in academia, environment and service sectors
- (iii) attract graduates with strong theoretical background in Biology, Agriculture and Environmental Sciences to a career in applied zoology.
- (iv) encourage and develop interdisciplinary skills across all aspects of the biological sciences; and
- (v) provide the skills needed to undertake independent research projects both in the industry and within the university environment.

### 4. **SUMMARY OF THE REVIEW**

The following is the summary of the major review carried out (the details of the revision have been provided on the table provided)

- (i) The existing compulsory courses in the various areas of specialization have either been reviewed in line with the needs of each area of specialization or new specialized courses introduced to cater for new trends in each research area.
- (ii) The units assigned to some courses have been revised as the case may be.
- (iii) A maximum number of course units to be offered have been introduced to prevent students from open-ended registration for courses by students.
- (iv) The contents of a number of courses have been reviewed and in many cases reworked
- (v) New courses have been introduced to ensure flexibility and to take care of modern scientific trend in the different areas of specialization.
- (vi) The content of each course has been made flexible to take care of applicants that may be slightly deficient in some of the fundamental courses in view of the varying backgrounds of applicants for the programme.

## **5. DEGREE TO BE OFFERED**

The higher degree programme in Zoology will be available at the M.Sc., M.Phil. and Ph.D. levels with specializations in Ecology, Entomology, Genetics, Physiology, Fisheries, Limnology/Hydrobiology Parasitology and Vertebrate Biology.

## **6. ADMISSION REQUIREMENTS**

Applicants for admission into the postgraduate programme in Zoology shall satisfy the general admission requirements approved by the Postgraduate College as stated in Regulations 8,9, and 10 of the Obafemi Awolowo University's Regulation Governing Postgraduate Studies (2005).

### **(a) M.Sc. Degree**

An applicant for admission into the Master programme in Zoology shall be a graduate of Obafemi Awolowo University or of any other approved University with at least a Second Class Honours (Lower Division) B.Sc. degree in Zoology, Biology, Agriculture, and other biological sciences disciplines depending on the candidate's chosen area of specialization. In exceptional cases, a Third Class degree holder may be considered for admission. Such a candidate shall be required to pass a departmental qualifying examination.

### **(b) M.Phil. Degree**

A candidate with at least Second Class Honours (Upper Division) shall be eligible for admission into the M.Phil Programme.

A candidate with a Masters degree from a recognized University in a relevant area of specialization but fails to meet the requirements for admission into the Ph.D. programme shall be considered for admission into the M.Phil. Programme.

### **(c) Ph.D. Degree**

Candidates with a M.Sc. or M.Phil. degree of Obafemi Awolowo University or of any recognized University shall normally have obtained not less than an average of 60% (B+) in the coursework for the Masters degree to be eligible for admission to the Ph.D. degree programme.

A candidate whose detailed transcript for the M.Sc. degree is not made available by the degree awarding university may be considered for admission after due evaluation of the certificate and thesis project based on the former supervisor's confidential report.

A candidate with a non-thesis M.Sc. degree is not eligible for admission into the Ph.D. degree programme. Such a candidate may however, be considered for admission into the M.Phil. degree programme.

## 7. PERIOD OF STUDY

The programme of study for the Master of Science degree is a minimum of twelve months continuous residence. Approximately the first eight months are spent on coursework, research design and beginning research, while the last four months are devoted to intensive research, in course work, data analysis and the preparation of a thesis.

The period of study for a degree in Zoology shall be as follows

Degree	Period of Study in Semesters			
	Full-time		Part-time	
	Minimum	Maximum	Minimum	Maximum
M.Sc. and Phil	3	4	4	6
Ph.D.	6	8	6	10

## 8. COURSE REQUIREMENTS

All candidates in Zoology postgraduate Programme appropriate specialized courses under the available options.

### (a) M.Sc. Degree

The minimum course requirements for the award of a Master degree shall be 24 units and a maximum of 30 units, consisting of 9 units of compulsory course, taken from the areas of specialization listed, and 6 units for thesis project and 2 units for seminar. Courses may also be taken from outside the Department or the Faculty but always upon the recommendation of the Supervisor and the approval of the Graduate Committee.

(b) **M.Phil Degree**

The minimum course requirements for the award of the degree of Master of Philosophy shall be 24 units, consisting of 9 units of compulsory and specialized courses and 6 units for thesis project.

(c) **Ph.D. Degree**

A Ph.D. candidate shall be required to satisfy the following minimum requirements:

- (i) Obtain not less than an average of 60% (B) in the coursework for the Master's Degree or M.Phil degree from a recognized University.
- (ii) Thesis Project

**9. EXAMINATIONS**

All semester course examination shall consist of 3 hour papers. The requirements for the Master's and Doctorate programme are as follows:

(a) **M.Sc. and M.Phil Degrees**

- (i) Written papers on courses: Completed within the first 2 semesters from the time the candidate came into residence)
- (ii) One Departmental Seminar on Thesis Project
- (iii) Thesis and Oral Examinations: Assessed by a Board of Examiners as specified in the Obafemi Awolowo University Regulations Governing Postgraduate Studies (2005) for the award of M.Sc./M.Phil in Science)

(b) **Ph.D. Degree**

- (i) Qualifying Examination;
- (ii) Two Departmental Seminars on Thesis Project;
- (iii) Thesis and Oral Examination (As stated in the Obafemi Awolowo University Regulations Governing Postgraduate Studies (2005) for the award of M.Sc./M.Phil in Science)

**10. COURSE REQUIREMENTS**

The courses available in the Department are listed below: not all courses may however be offered every year. Those offered will depend upon staffing and the current research programme of the Department.

<b>Course Code</b>	<b>Course Title</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>Units</b>
ZOO 601	Ecology of Soil Animals	3	0	3	4
ZOO 602	Special Research Techniques in Ecology	2	0	3	3
ZOO 603	Statistical Ecology	2	0	3	3
ZOO 604	Insect Ecology and Ecotoxicology	2	0	3	3
ZOO 605	Comparative Morphology and Systematics of Terrestrial Arthropods	3	0	3	4
ZOO 606	Insect Physiology and Biology	2	0	3	3
ZOO 607	Animal Cytogenetics	2	0	3	3
ZOO 608	Advanced Molecular Genetics	2	0	3	3
ZOO 609	Advanced population Genetics	2	0	3	3
ZOO 610	Advanced Human Genetics	2	0	3	3
ZOO 611	Physical and Chemical Properties of Freshwater	2	0	3	3
ZOO 612	Deposits and Suspended Particulate Matter in Limnology	2	0	3	3
ZOO 613	Radiation Ecology and use of Isotopes	3	2	0	3
ZOO 614	Productivity and Production in Aquatic Environments	1	0	3	2
ZOO 615	Fish and Fisheries	2	0	3	3
ZOO 616	Advanced Animal Physiology	2	0	3	3
ZOO 617	Biology of Parasitism	2	0	3	3
ZOO 618	Helminthology	2	0	3	3
ZOO 619	Parasitic Protozoa	2	0	3	3
ZOO 620	Advanced Vertebrate Biology	2	0	3	3
ZOO 621	Advanced Animal Behaviour	2	0	3	3
ZOO 622	Advanced Ornithology	2	0	3	3
ZOO 623	Advanced Aquaculture	2	0	3	3
ZOO 624	Avian Physiology	2	0	3	3
ZOO 625	Aquaculture Nutrition	2	0	3	3
ZOO 626	Marine Mammal Ecology and Paleocology	2	0	3	3
ZOO 627	Primate Biology, Behaviour and Conservation	2	0	3	3
ZOO 628	Advanced Wildlife Management	2	0	3	3
ZOO 629	Insect-Plant Interactions	2	0	3	3

<b>Course Code</b>	<b>Course Title</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>Units</b>
ZOO 630:	Insect Physiology and Molecular Biology	2	0	3	3
ZOO 631	Entomological Techniques and Immature Insects	2	0	3	3
ZOO 632	Plankton Biology	2	0	3	3
ZOO 633	Biological Control of Arthropods	2	0	3	3
ZOO 634	Animal Phylogenetic Systematics	2	0	3	3
ZOO 635	Honey Bees and Insect Societies	2	0	3	3
ZOO 636	Insects, Aquatic Habitats and Pollution	2	0	3	3
ZOO 637	Insect Behaviour	2	0	3	3
ZOO 638	Insect Pathology	2	0	0	2
ZOO 639	Forensic Entomology	2	0	3	3
ZOO 640	Fish Broodstock Management and Seed Quality	2	0	3	3
ZOO 641	Insect Mating System	2	0	3	3
ZOO 643	Seminar	0	0	2	2
ZOO 644	Thesis				6

## 11. DETAIL OF MODIFICATIONS

<b>Course Code</b>	<b>Course Title</b>	<b>Unit</b>	<b>Remark</b>
ZOO 601	Ecology of Soil Animals	4	
ZOO 602	Special Research Techniques in Ecology	3	
ZOO 603	Statistical Ecology	3	
ZOO 604	Insect Ecology and Ecotoxicology	3	Course title amended to include Ecotoxicology to accommodate pollutant effects on distribution of insects and their tolerance
ZOO 605	Comparative Morphology and Systematics of Terrestrial Arthropods	4	
ZOO 606	Insect Physiology and Biology	3	
ZOO 607	Animal Cytogenetics	3	Course contents replaced to accommodate new trends
ZOO 608	Advanced Molecular Genetics	3	
ZOO 609	Advanced population Genetics	3	Course contents replaced to accommodate new trends

<b>Course Code</b>	<b>Course Title</b>	<b>Unit</b>	<b>Remark</b>
ZOO 610	Advanced Human Genetics	3	Course contents broaden in scope
ZOO 611	Physical and Chemical Properties of Freshwater	3	
ZOO 612	Deposits and Suspended Particulate Matter in Limnology	3	
ZOO 613	Radiation Ecology and use of Isotopes	3	Course title expanded to include Radiation Ecology. Units increased from 2 to 3 to accommodate new topics
ZOO 614	Productivity and Production in Aquatic Environments	2	
ZOO 615	Fish and Fisheries	3	
ZOO 616	Advanced Animal Physiology	3	
ZOO 617	Biology of Parasitism	3	Title of the course and the contents changed to address new topics
ZOO 618	Helminthology	3	
ZOO 619	Parasitic Protozoa	3	Code assigned to a newly designed course in parasitology
ZOO 620	Vertebrate Biology	3	Code of the course amended
ZOO 621	Advanced Animal Behaviour	2	Code and title of the course amended to incorporate some advanced animal behaviours
ZOO 622	Advanced Ornithology	3	Code of the course changed to accommodate a new course in Vertebrate Biology Option
ZOO 623	Advanced Aquaculture	3	New course in Fisheries Option
ZOO 624	Avian Physiology	3	New course in Vertebrate Biology Option
ZOO 625	Aquaculture Nutrition	3	New course in Fisheries Option
ZOO 626	Marine Mammal Ecology and Paleocology	3	New course in Vertebrate Biology Option
ZOO 627	Primate Biology, Behaviour and Conservation	3	New course in Vertebrate Biology Option

<b>Course Code</b>	<b>Course Title</b>	<b>Unit</b>	<b>Remark</b>
ZOO 628	Advanced Wildlife Management	3	New course in Vertebrate Biology Option
ZOO 629	Insect-Plant Interactions	3	New course in Entomology Option
ZOO 630:	Insect Physiology and Molecular Biology	3	New course in Entomology Option
ZOO 631	Entomological Techniques and Immature Insects	3	New course in Entomology Option
ZOO 632	Plankton Biology	3	New course in Limnology/ Hydrobiology Option
ZOO 633	Biological Control of Arthropods	3	New course in Entomology Option
ZOO 634	Animal Phylogenetic Systematics	3	New course in Advanced Biological Systematics
ZOO 635	Honey Bees and Insect Societies	3	New course in Entomology Option
ZOO 636	Insects, Aquatic Habitats and Pollution	3	New course in Entomology Option
ZOO 637	Insect Behaviour	3	New course in Entomology Option
ZOO 638	Insect Pathology	2	New course in Entomology Option
ZOO 639	Forensic Entomology	3	New course in Entomology Option
ZOO 640	Fish Broodstock Management and Seed Quality	3	New course in Fisheries Option
ZOO 641	Insect Mating System	3	New course in Entomology Option
ZOO 643	Seminar	2	Course Code changed from 621
ZOO 644	Thesis	6	New Course Code for Thesis

## 12. DESCRIPTION OF COURSES

### ***ZOO 601: Ecology of Soil Animals 2+0+3 (4 units)***

Soil as a habitat. Measurement of edaphic factors. Preservation and identification of soil animals. Litter and soil fauna of different vegetation and soil types. Statistical methods in soil ecology. Population processes distribution, succession trophic interactions, etc, Decomposition processes. Effect of human activities on the soil fauna – clearing, silvicultural practices, application of pesticides and herbicides etc.

### ***ZOO 602: Special Research Techniques in Ecology 2+0+3 (3 units)***

The theory and principle underlying the equipment for measuring temperature, moisture humidity and light. Soil aeration and CO<sub>2</sub> tension. Meterological instrumentation. Photography and aerial survey. Remote sensing.

### ***ZOO 603: Statistical Ecology 2+0+3 (3 units)***

The use of parametric tests (t-test, Analysis of Variance, etc.) and non-parametric tests (the Mann-Whitney U-test, Friedman test, Kruskal-Wallis test, etc) in Ecology. Multiple and partial correlation and regression. Multivariate statistical analysis (Principal Component analysis, Factor Analysis, Canonical Correlation, Cluster analysis etc).

### ***ZOO 604: Insect Ecology and Ecotoxicology 2+0+3(3 units)***

Insect populations and climatic effects. Diversity and abundance of insects. Synthetic analysis of causes of insect diversity and fluctuations, emphasis on abiotic, biotic and evolutionary mechanisms influencing insect populations and communities. The Ecology of pest control, including biological control. Intra-specific competition and dispersal; prey-predator interaction and strategies. Life-table and key-factor studies in insect natural populations. Pollutants and their effects on spatial and temporal distribution of insects. Adaptation and tolerance of insects to pollutants.

### ***ZOO 605: Comparative Morphology and Systematics of Terrestrial Arthropods 2+0+3 (3 units)***

The arthropod integument – its structure and derivatives; Body regions – head, thorax, abdomen and their appendages in different groups of arthropods. Wings

in insects: their origin, development and structure in different insect groups. The reproductive, alimentary, respiratory, circulatory, excretory, nervous and muscular systems in arthropods. Classification and phylogeny of terrestrial arthropods, with special emphasis on the orders and families of insects, arachnids and myriapods.

***ZOO 606: Insect Physiology and Biology 2 + 0+3 (3 units)***

Current techniques in insect physiology. Digestion excretion; water and temperature relations. Respiration; circulation; nutrition; metabolism and energetics. Reproduction. The physiological properties of insect muscle. Nervous system and sense organs. Insect haemolymph, hormones and pheromones. Integrated control of insect pest including the physiology of insecticide resistance.

***ZOO 607: Animal Cytogenetics 2+0+3 (3 units)***

The basic chromosome structure and chromosome function – chemical composition, telomeres, centromeres and kinetochores, nucleolar organizers, chromomeres, euchromatin and heterochromatin, Unique and repetitive DNA, Chromosome structure throughout the cell cycle, banded chromosomes, lampbrush chromosomes, polytene chromosomes, B Chromosomes.

Variation in chromosome structure – duplications, deletions, inversions, and translocations, isochromosomes, ring chromosomes, centric fissions and fusions.

Changes in chromosome number - aneuploidy and euploidy in both plants and animals; their origins and cytogenetic effects, use in crop breeding and adaptive significance.

Variant Chromosome Systems – asexual reproduction, modified sexual reproduction (various forms of parthenogenesis) chromosome diminution and elimination. Evolution of the karyotype – evolution of sex chromosomes. Molecular cytogenetics. Techniques in cytogenetics.

***ZOO 608: Advanced Molecular Genetics 2+0+3 (3 units)***

The cell division cycle. Components of the chromosome, nucleic acids and proteins organizations of the genetic apparatus. The procaryotic chromosome, variations in terms of size, structure and composition. The eucaryotic chromosome; organization of chromatin fibers. Continuity of DNA threads in

chromosome. Distribution of DNA between and within chromosomes. Hybridization between DNA and DNA: DNA and RNA. Repetitive Sequences. DNA synthesis in procaryotes and eucaryotes. Control of replication. Repair synthesis. DNA synthesis in vitro. Transcription. The genetics code. Ribosomes, ribosomal RNA and transfer RNA. Protein Synthesis (Translation) Control of transcription and translation. Operon control circuits – positive and negative control systems. Chemical mutagens and mutagenesis. Recombinant DNA and genetic engineering.

***ZOO 609: Advanced Population Genetics 2+0+3 (3 units).***

Genetic and phenotypic variation. The organisation of genetic variation. The Hardy-Weinberg equilibrium law and its uses. Forces that disrupt the Hardy-Weinberg equilibrium – random genetic drift, mutation, Darwinian selection, inbreeding, population subdivision and migration gene flow. Molecular population genetics and evolutionary quantitative genetics. Human population genetics and population genomics

***ZOO 610: Advanced Human Genetics 2+0+3 (3 units)***

Mendelian, multifactorial, chromosomal and mitochondrial disorders in humans. Genetics of immunity, behaviour and cancer. Gene therapy and genetic counseling and treatment of genetic disorders. Human reproductive technologies. The human genome project and genomics.

***ZOO 611: Physical and Chemical Properties of Freshwater 2+0+3 (3 units)***

Origin and diversity of freshwater, Ecological features of rivers, streams, lakes, ponds and impoundments. The biological importance of temperature, water movements, thermal stratification and light penetration. The circulation of dissolved substances, their interaction importance in biological activity. Emphasis will be laid on practical training in water analyses; carbondioxide, iron, ammonia, nitrite, phosphate, pH, electrical conductivity, biological oxygen demand will be measured.

***ZOO 612: Deposits and Suspended Particulate Matter in Limnology  
2+0+3 (3 units)***

Sediment analyses for major elements and nutrients. Role of particulate matter and deposits in biological activity. Ion exchange between the mid-water interface. Benthos and benthic organisms.

***ZOO 613: Radiation Ecology and Use of Isotopes 2+0+3 (3 units)***

Experiments in the use of isotopes C<sup>14</sup>, P<sup>32</sup>, tritium, N<sup>15</sup> in Biology. Uptake of ions by plants and animals.

***ZOO 614: Productivity and Production in Aquatic Environments 1+0+3 (2 units)***

Concepts of production, productivity and yield. Measurements and experiments on primary, secondary and tertiary productivity.

***ZOO 615: Fish and Fisheries 2+0+3 (3 units)***

Taxonomy of major groups and the communities of selected tropical fish species. The place of fish in freshwater communities, their food, sex and age determination, growth rates, fecundity, mortality and population determinations. Fishing gear. Fish production and fishery methods.

***ZOO 616: Advanced Animal Physiology 2+0+3 (3 units)***

Physiological adaptation of animals to their environment. Excitation of animal cells and receptors. The propagation and transmission of nerve impulses from cell to cell including electrical events in transmission. The mechanics and biochemical basis of muscle contraction. Nutrition, body fluids and their circulation. Digestive enzymes and their kinetics. Respiration, temperature. Hormones in metabolism growth and reproduction.

***Zoo 617: Biology of Parasitism 2+0+3 (3 units)***

Animal associations and concept of parasitism; adaptations in structure and life cycles of parasites; host-parasite relationships; immunity; host reaction to parasites; host specificity; evasion of host resistance; modes of invasion by parasites; influence of parasites on hosts, population dynamics of parasites; epidemiology; parasite control.

***ZOO 618: Helminthology 2+0+3 (3 units).***

A review of major helminthes of medical and veterinary importance. Special attention is given to the study of adaptive properties of major parasitic helminthes. Host-helminth association and the relation of selected helminthes to human welfare, and the comparative pathobiology and biochemistry will be considered. Methods used in helminthological research with particular references to tropical parasitic diseases, their epidemiology, immunochemistry, enzymology, physiology diagnosis, control and mode of action of antiparasitic agents are considered. Each student conducts an experimental study which demonstrates helminth parasitism as well as provides new information on the particular subject.

***ZOO 619: Parasitic Protozoa 2+0+3 (3 units)***

Taxonomy and classification, anatomy, physiology and ecology of protozoa. Morphology, life cycle, pathology, control, and epidemiology and control of parasitic protozoa of medical and veterinary importance.

***ZOO 620: Advanced Vertebrate Biology 2+0+3+ (3 units)***

Taxonomy and evolution of vertebrates with particular emphasis on small mammals. Geographical distribution and adaptive radiation. Feeding, reproduction, hibernation and economic importance including game mammals and rodent pest control. All topics will be treated with special attention to tropical and local materials.

***ZOO 621: Advanced Animal Behaviour 2+0+3 (3 units)***

Abiotic and biotic factors affecting development, foraging and recruitment among social insects (e.g. ants, bees and termites). The reactions of invertebrate animals towards natural attractants and repellants. Review of communication in invertebrates; chemoreception (e.g. Pheromones), acoustics behaviour, vision and tactile stimuli. Circadian rhythms. Neurophysiology and sense organs. Orientation behaviour: effects of gravity, temperature, humidity and light etc. Survey of mammalian behaviour with in-depth study in one or more of the following areas: Bioacoustic behaviour in rodents and bats; temperature regulation in tropical small mammals; photoperiods ethology. Seminar courses per week dealing with intensive consideration of selected areas in the behaviour of animals, particularly vertebrate species. A semester paper outside student's area of thesis research must be presented.

***ZOO 622: Advanced Ornithology 2+0+3 (3 units)***

Origin and evolution of flight, bird phylogeny and current phylogenetic classification of birds. Tendencies towards evolution of birds. Comparative study of the retina of birds in relation to accommodation. Food selection of birds and reliability of communication, breeding habits and territoriality. Evolution conspicuous and distinctive coloration for communication in birds. Atmospheric structure and avian migration. Passerine migration between palearctic and Africa.

***ZOO 623: Advanced Aquaculture 2+0+3 (3 units)***

Aquaculture practices and technological developments; Aquaculture – Environment Interactions; Indigenous and alien species in Aquaculture; Biology and culture of aquaculturally important and emerging species; Development in artificial propagation of individual species and/or groups; Larviculture; Genetics and Aquaculture; Health Management (fish diseases and treatment); Policy developments in Aquaculture; Socio-economics of Aquaculture and impacts aquatic weed control.

***ZOO 624: Avian Physiology 2+0+3 (3 units)***

A broad examination of the physiology of the avian body with emphasis on aspects uniquely avian.

***ZOO 625: Aquaculture Nutrition 2+0+3 (3 units)***

Development in feeds and feeding strategies of cultured species, Feedstuffs; Feed formulation; feed manufacturing technology; Practical fish diets; Digestion, Physiology and Anatomy; Nutritional bioenergetics; Nutritional Biochemistry in fish.

***ZOO 626: Marine Mammal Ecology and Paleocology 2+0+3 (3 units)***

An introduction to the evolution, zoogeography and population ecology of marine mammals (Cetacea, Pinnipedia and Sirenia), with a discussion of extinct groups.

***ZOO 627: Primate Biology, Behaviour and Conservation 2+0+3 (3 units)***

This course offers the following areas of study: Primate conservation issues, habitat loss and alteration, hunting, conservation genetics, *ex site* and *in situ* conservation, human wildlife conflict, attitudes to primates.

***ZOO 628: Advanced Wildlife Management 2+0+3 (3 units)***

An in-depth look at selected wildlife management problems, in addition to seminars and/or lectures, the student is expected to investigate and report on an existing wildlife management problem.

***ZOO 629: Insect-Plant Interactions 2+0+3 (3 units)***

Examination of the natural history, ecology, and evolution of insect/plant relationships. Mechanisms and theory of plant defense, behavioural and physiological adaptations of herbivorous insects, pollination biology, multitrophic-level interactions, causes of insect outbreaks, applications to managed ecosystems.

***ZOO 630: Insect Physiology and Molecular Biology 2+0+3 (3 units)***

Principles of insect molecular biology. Analysis of insect development, reproduction, behaviour, immunity, transgenic insects and insecticides resistance at the molecular level. Hands-on experience with molecular biology techniques. Roles of cytochrome p450 genes in pesticide resistance.

***ZOO 631: Entomological Techniques and Immature Insects 2+0+3 (3 units)***

Entomological techniques and data analysis. Bionomics, structure and classification of immature stages of insects; practice in their identification.

***ZOO 632: Plankton Biology 2+0+3 (3 units)***

Plankton taxonomy: Outline classification and diagnostic features of major plankton groups (algae, protozoans, rotifers, microcrustacean, and larval forms); Plankton ecology difference between freshwater and marine plankton, factors controlling their distribution and production. Field and laboratory techniques in plankton studies; collection and treatment methods, preparation of plankton permanent slides; biomass estimation by cell counts, volume and pigment analysis. Importance of plankton and roles in natural waters.

***ZOO 633: Biological control of Arthropods 2+0+3 (3 units)***

Principles related to the use of arthropods to suppress populations of arthropod pests. Includes: historical perspective, ecological relationships, and contemporary issues relating to the conservation and manipulation of arthropod predators, parasitoids, and herbivores.

***ZOO 634: Animal Phylogenetic Systematics 2+0+3 (3 units)***

Overview and introduction; Theory and methods of molecular phylogenetics; Sequence database and database searching; Alignment of DNA sequences, Sources of molecular data in systematics, Phylogeny reconstruction from molecular data, Selection, rates and dates; Tree concept, Gene trees versus species trees, Molecular evolution; models of nucleotide substitution. Applications of phylogenetic analysis such as historical biogeography, biological classification and testing of ecological hypothesis.

***ZOO 635: Honey Bees and Insect Societies 2+0+3 (3 units)***

Natural history, identification, and behaviour of honey bees and other social insects. Evolution of social behaviour, pheromones and communication, organization and division of labour, social parasitism. Field course in honey bee management, conservation and maintenance of colonies.

***ZOO 636: Insects, Aquatic Habitats and Pollution 2+0+3 (3 units)***

Effects of pollutants on biology, ecology and community structure of aquatic insects. Life-cycle, trophic guilds, community structure in lotic/lentic habitats. Organic pollution/eutrophication, heavy metal pollution, runoff/siltation, acidification, thermal pollution. Changes in aquatic insect community structure for each class of pollutant. Biological monitoring networks.

***ZOO 637: Insect Behaviour 2+0+3 (3 units)***

Sensory perception, Basic responses and patterns of behaviour, Behavioral periodicity and clocks. Displacement, orientation, navigation and homing. Communication, reproduction, host and feeding, defence, parental care and presocial behaviour, Eusocial behaviour. Genetic basis of behaviour. Behavioural traits with Mendelian and more complex modes of inheritance. Emphasis on evolution and diversity of behaviours.

***ZOO 638: Insect Pathology 2+0+0 (2 units)***

Major pathogenic microorganisms that cause diseases in insects. Routes of infection of insects. Factors in application of disease to pest insect control with safety considerations.

***ZOO 639: Forensic Entomology 2+0+3 (3 units)***

This course emphasizes how insects and related arthropods are used to determine postmortem intervals and estimate time of death in murder investigations. Introduction to forensic entomology, entomology and the law, Scope and status of forensic entomology, How to recognize and collect insects of forensic importance – the beetles (Coleoptera) and flies (Diptera), their development and when insects become valuable evidence. Analysis of entomological evidence. Human decomposition and insect succession. Factors that influence decomposition and insect succession. Factors that influence decomposition and succession.

***ZOO 640: Fish Broodstock Management and Seed Quality 2+0+3(3units)***

Control of reproduction, hypophysation, environmental manipulation, cryopreservation, gene banks and conservation, egg quality, broodstock husbandry and stress management.

***ZOO 641: Insect Mating System 2+0+3 (3 units)***

Evolutionary hypothesis and tests. Modes of reproduction. Sexual selection theory. Timing of mate location. Motivation to copulate. Competition in the attraction of females. Selection and defense of mating sites. Male mating systems. Protection of females during courtship and copulation. Sperm competition and fertilization of eggs. Selective mate choice by female. Female mating system.

***ZOO 642: Ecological and Environmental Genetics 2+0+3 (3 units)***

Mendelian genetics. Gene expression and control. Variation, its causes and purpose. Genetics and ecology. Natural selection and ecology. Environmental and genetics component of a trait. HardyWeinberg equilibrium. Environment and gene expression, individual genome and change in gene frequencies.

Genetically modified organisms. Toxic environmental agents and the health and lifestyle of humans.

***ZOO 643: Seminars 2+0+2 (2 units)***

Directed readings in Zoology and current research topics

***ZOO 644: Thesis (6 units)***

### 13. LIST OF ACADEMIC STAFF FOR POSTGRADUATE PROGRAMMES

<b>Name/Qualification</b>	<b>Rank</b>	<b>Areas of Specialization</b>
G.A. O. Arawomo, B.Sc, M.Phil, (Ife), Ph.D. (Stirling)	Professor	Fisheries
J.I. Awopetu, B.Sc. (Ife), Ph.D. (Aberdeen)	Professor	Population and Ecological Genetics
S.O. Asaolu, B.Sc. (Ife), Ph.D. (Camb)	Professor	Parasitology
M.A. Badejo, B.Sc., M.Sc., Ph.D. (Ife)	Professor	Entomology/Soil Ecology and Ecotoxicology
W.A. Muse B.Sc., M.Sc., Ph.D. (Ife)	Professor	Physiology, Applied Entomology
I.F. Adeniyi, B.Sc., M.Phil., Ph.D. (Ife)	Professor	Hydrobiology, Limnology
A.I. Akinpelu, B.Sc. (Calabar), M.Sc. (Ibadan), Ph.D. (Ife)	Professor	Ornithology, Vertebrate Biology/Parasitology
V.F. Olaleye, B.Sc., M.Sc., Ph.D. (Ife)	Professor	Aquaculture/Applied Limnology and Fisheries
S.S. Ogbogu, B.Sc., M.Sc., Ph.D. (Ibadan)	Professor	Aquatic Entomology
O.O. Komolafe B.Sc., M.Sc., Ph.D. (Ife)	Senior Lecturer	Fish Biology/Ecology
O.A. Sowemimo B.Sc., M.Sc., Ph.D. (Ife)	Senior Lecturer	Parasitology
M.O. Awodiran B.Sc., M.Sc., Ph.D. (Ife)	Lecturer I	Cytogenetics/Molecular Genetics
M.E. Ajibola B.Sc., M.Sc., Ph.D. (Ife)	Lecturer I	Vertebrate Biology
A.A. Adedeji (Mrs) B.Sc., M.Sc., Ph.D. (Ife)	Lecturer I	Hydrobiology/Limnology
O.J. Owojori B.Sc., M.Sc., Ph.D. (Stellenbosch)	Lecturer I	Entomology/Ecotoxicology
T.O. Kehinde B.Sc., M.Sc. (Ife), Ph.D. (Stellenbosch)	Lecturer I	Insect Biology and Conservation