

COLLEGE OF SCIENCES AND ENGINEERING

Dean: Dr. Patrick Carriere

Master of Biology (MS/BIOL)

Chair: D'Auvergne, Oswald

P.O. Box 9310

Baton Rouge, LA 70813 William James Hall – Room 244

Phone: (225) 771-5210; Fax: (225) 771-5386

FACULTY

Professors:

D'Auvergne, Oswald

Ph.D., Immunoparasitology

University of Michigan

Samkutty, Pushpa

Ph.D., Dairy Microbiology Louisiana State University

Martinez-Ceballos, Eduardo Ph.D., Cell and Molecular Biology

Tulane University

Associate Professors:

Johnson, Alice Ward

Ph.D., Cellular, Molecular, and Developmental Biology

Iowa State University

Rogers, Bryan

Ph.D., Genetics

University of California

Ogunkoya, Yetunde

Ph.D., Gastroenterology

Murdoch University, Australia

Telles, Caroline

Ph.D., Microbiology

Louisiana State University

Dubyska, Lidiya

Ph.D., Molecular Genetics

Ivan Franko National

University of Lviv, Ukraine

Assistant Professors:

Atkins-Ball, Deidra

Ph.D., Pharmacology

Meharry Medical College

Yi, Xiaoping

Ph.D., Cell Biology/Plant Genetics

Sichuan Agricultural University, China

DEGREE/GRADUATION REQUIREMENTS

Thesis Option

✓ Completion of a program consisting of 24 hours of course work (16 hours in biology must be at least 500 level courses) and six hours of thesis research

✓ A composite passing score on the departmental Comprehensive Examination

✓ A successful defense of the thesis.

Non-Thesis Option

- ✓ Completion of a program of 30 hours of course work (24 hours must be at or above the 500 level) and six hours of research.
- ✓ A composite passing score on the departmental
- ✓ Comprehensive Examination.
- ✓ A written research project.

MASTER OF SCIENCE IN BIOLOGY

PLAN OF STUDY

First Semester (Fall) Credits

BIOL 501	Graduate Seminar I	1
BIOL 507	Scientific Writing	2
BIOL	Required Electives	6-12

Second Semester (Spring) Credits

BIOL 505	Graduate Seminar II	1
BIOL 598	Supervised Research	1-15
BIOL	Required Elective	8

Summer#1 Credits

BIOL 598	Supervised Research	1-15
	(Non-Thesis option)	
BIOL 600	Thesis	1-15

Third Semester (Fall)

Thesis preparation and defense

BIOL	Required Electives.....	6
	(Non-Thesis option)	

Electives are to be chosen in consultation with the student's academic advisor. All electives must be approved by the department chair as part of an overall, academically sound plan of study before being submitted to the Graduate School for approval by the Graduate Dean.

Introduction

The Department of Biological Sciences offers a thesis option and a non-thesis option, both of which may lead to the Master of Science degree.

Objectives

The objectives of the program are as follows:

- ✓ To provide advanced training in biology for individuals who wish to pursue careers in industry, government, and education
- ✓ To provide advanced training in biology for individuals who wish to pursue study at the doctoral level
- ✓ To provide advanced training in biology for individuals who wish to strengthen their background in the life sciences

GRADUATE DEGREE OFFERED

M.S. Master of Science in Biology

ADMISSION REQUIREMENTS

In addition to meeting the admission requirements of the Southern University Graduate School, all applicants must:

1. Possess a bachelor's degree from an accredited institution.
2. Have a minimum cumulative 2.7 grade point average on a 4.0 scale.
3. Submit three letters of recommendation; one of which must be from a faculty advisor.
4. Submit a brief description of career plans.
5. Have a combined GRE score (General Test) of 286 or higher, and have a minimum TOEFL score of 525 (International Students).

COURSE DESCRIPTION

BIOL 500. SPECIAL PROBLEMS IN BIOLOGY (Credit, 3 hours). Provides an opportunity for the student to pursue a topic or problem of interest, under the supervision of members of the faculty.

BIOL 501. GRADUATE SEMINAR I (Credit, 1 hour). Discussion of a wide range of topics from the biological sciences.

BIOL 502. GENERAL TOXICOLOGY (Credit, 3 hours). This course is designed to present information relative to a wide variety of pollutants which persist in the environment as a result of modern industry and pest-control management programs. The student will acquire knowledge concerning the modes of action of various chemicals which disrupt the normal physiology of living organisms. Phenomena such as biomagnification, genetic resistance, synergism, antagonism, and the effects of drugs on human behavior will also be studied. (Prerequisites: Chemistry 220, 221, 230, and 231.)

BIOL 505. GRADUATE SEMINAR II (Credit, 1 hour). Discussions of a wide range of topics from the biological sciences.

BIOL 506. BIostatistics: EXPERIMENTAL DESIGN AND ANALYSIS (Credit, 3 hours). This course is designed to acquaint advanced biology students with research designs for biological experimentation. Emphasis is on parametric and non-parametric statistical analysis and their applicability to more advanced experiments.

BIOL 507. SCIENTIFIC WRITING (Credit, 2 hours). This course is designed to teach the writing skills necessary to effectively communicate scientific information in a format that is acceptable to the scientific community. The course will emphasize the development of writing skills needed for proposals and theses.

BIOL 508. ENVIRONMENTAL SCIENCE EDUCATION (Credit, 3 hours). This course is concerned with general ecological principles and basic concepts of environmental science. Topics discussed include characteristics of the biotic and abiotic environment, interactions and interrelationships within and between the various environments, the conservation and management of natural resources, and the effect of the environment upon man's physical, economic, and recreational well-being.

BIOL 510. ADVANCED FIELD BOTANY (Credit, 3 hours). This course incorporates the method for the study, preservation, taxonomic treatment, and storage of botanical materials. (Prerequisites: Biology 310 or consent of the instructor.)

BIOL 511. PHYSIOLOGY OF PLANTS (Credits, 4 hours). This course is designed to review, understand, and demonstrate some life supporting phenomena that occur in plants. A study of plants' physiological phenomena, such as absorption and movement of water, mineral nutrition, photosynthesis, and growth regulators will be conducted.

BIOL 512. ELECTRON MICROSCOPY TECHNIQUES (Credit, 4 hours). This course is designed to familiarize graduate students in biomedical fields with the basic principles and techniques involved in preparing specimens for the scanning and transmission electron microscopes.

BIOL 520. ECOLOGICAL PRINCIPLES (Credit, 4 hours). This course involves the study of animals, plants, and microorganisms in relation to habitat and the factors which affect them directly or indirectly. The principles of ecology will be discussed in detail.

BIOL 523. ENVIRONMENTAL MICROBIOLOGY (Credit, 4 hours). (Lecture, 2 hrs; Lab., 4 hours per week). This course will involve an advanced study of the practices of biodegradation and bioremediation with emphasis on microbial ecology. Basic concepts of entrophication, indicator organisms, soil and aquatic microorganisms; assessment of biological treatment practices in water reuse and/or purification. Current practices in biodegradation and bioremediation will be discussed.

BIOL 530. ADVANCED VIROLOGY (Credit, 3 hours). This course will involve the study of the molecular biology and pathogenesis of animal viruses. Recent discoveries and new directions in research will be emphasized. (Prerequisites: Biology 402 and Chemistry 340 and 342.)

BIOL 532. IMMUNOBIOLOGY (Credit, 4 hours). A study of cells and cellular events involved in humoral and cell-mediated immune responses. Topics to be covered will include development of the immune system, antigenicity, antigen-antibody reactions, immunoglobulin structure, complement, transplantation immunity, autoimmunity, immune deficiency diseases, and tumor immunity.

BIOL 533. MICROBIAL PHYSIOLOGY (Credit, 3 hours). The principles of functional activities and the intermediary metabolism of microbes. The course will also involve a study of microbial growth and methods used to measure this activity. In addition, cell extract preparation, enzyme activity, and metabolic products will be studied. (Prerequisites: Biology 232, Chemistry 230, 220, 231, and 221.)

BIOL 534. CELL PHYSIOLOGY (Credit, 4 hours). (Lecture, 2 hrs; Lab., 4 hours per week). A study of the fundamental cellular functions with emphasis on molecular and biochemical principles, enzyme catalysis, metabolic pathways, the flow of information and energy, and energy transformation and mobilization. (Prerequisite: Chemistry 230, 220, 231, and 221.)

BIOL 536. MAMMALIAN PHYSIOLOGY (Credit, 4 hours). (Lecture, 2 hrs; Lab., 4 hours per week). A comprehensive coverage of the mechanisms and functions associated with the maintenance of the overall steady state in the mammalian body. (Prerequisites: Chemistry 230, 220, 231, and 221.)

BIOL 540. REPRODUCTIVE PHYSIOLOGY (Credits, 4 hours). This course is designed as a basic, scientific study of reproductive processes in mammals (primarily humans and rats) and as a framework for the proper assessment of current progress and

problems related to important aspects of human reproductive biology. (Prerequisites: Biology 442.)

BIOL 543. PARASITOLOGY (Credit, 4 hours). (Lecture, 2 hrs; Lab., 4 hrs per week). This course is designed to an in-depth study of the phenomena of parasitism and pathogenicity in vertebrates, including humans. Emphasis will be on the identification, life cycles, physiology, symptoms, diagnosis, epidemiology, causes and treatments of parasitic diseases. The course will include a discussion of host-parasite relationships. The biochemical aspects of parasitology will be stressed.

BIOL 550. MOLECULAR BIOLOGY OF THE CELL (Credits, 3 hours). This course covers topics concerning the molecular organization of cells, genomic organization, and the expression of the genes of prokaryotic and eukaryotic organisms. The application of the biochemical and molecular genetic principles of cell biology, the structural organization of genes, the mechanisms of gene expression, and modern molecular biology techniques used for gene manipulation will be discussed. (Prerequisites: Chemistry 340, 342.)

BIOL 551. PROKARYOTIC GENETICS (Credits, 4 hours). (Lecture, 2 hrs; Lab., 4 hours per week). This course is designed to familiarize students with topics associated with gene organization, chromosome structure, regulation of gene action, gene mutation, repair and transfer and genetic recombination. Laboratory exercises involve properties and structural study of DNA, analysis of a genome segment, polymerase chain reaction, DNA sequencing, DNA fingerprinting, and cloning of phage DNA in *E. coli* cells. (Prerequisites: Chemistry 340, 342.)

BIOL 552. SELECTED TOPICS IN BIOMEDICAL SCIENCES (Credits, 3 hours). This is a multidisciplinary seminar/laboratory course. Topics will include advances in biomedical sciences relating to human health and disease, with emphasis on nutritional and genetic disorders, diabetes, Alzheimer's disease, AIDS, and cancer. Laboratory demonstrations of methods will be presented.

BIOL 598. Supervised Research (Credit, 1-15 hours).

BIOL 600. THESIS (Credit, 1-15 hours).