

DOCTOR OF PHILOSOPHY IN BIOLOGY

The Doctor of Philosophy in Biology program is designed to provide advanced study and research in the biological sciences. Strong emphasis is placed on the development of scientific skills and values which are useful in the conduct of independent field investigation and/or laboratory experimentation. A study program consisting of selected coursework and independent projects is prepared for each student. Opportunities for representation and publication of student research are also provided.

Program Requirements

Advanced Academic Writing Courses	(6 units)
Basic Courses	9 units
Major Courses	15 units
Elective Courses	12 units
Seminar	2 units
Compre Exams	0 units
Dissertation	12 units
Total	50 units

Course Descriptions:

Advanced Academic Writing Courses:

Advanced Technical Reading and Writing 1 (ENG501M)

3 units

The first part of an intensive English academic reading and writing course, focuses on the review of basic reading and writing course, focuses on the review of basic reading and writing skills and their application in the preparation of short academic papers such as definitions and descriptions, and non-prose forms. It emphasizes the mastery of active reading strategies, the effective use of rhetorical and organizational features of academic writing and proper documentation.

Advanced Technical Reading and Writing 2 (ENG502M)

3 units

The second part of an intensive English academic reading and writing course, focuses on the writing of data commentary and the various parts of a research report, with emphasis on the different rhetorical moves and the linguistic features that realize these moves. The course continues to emphasize the observance of integrity in writing and research.

Basic Courses:

Bioethics (BIO503D)

3 units

This is an introduction to the basic theories, principles and concepts of a comprehensive life ethics that ranges from the conventional bioethics understood as biomedical ethics to

ecological or environmental ethics considering that individual and social human health can only be achieved within a healthy planetary biosphere, i.e., a clean natural environment. Such a comprehensive bioethics probes the ethical dimensions of (bio)technological developments in the life sciences, increasingly under pressure of the forces of a globalized market ideology, as they impact on the sustainability of life its diversity on this garden planet of the universe.

Developmental Biology (Lecture) (BIO653D)

2 units

A course dealing with different processes of development in animals encompassing embryonic, post-embryonic, and adult stages. It integrates relevant aspects of genetics, cellular, and molecular biology and other field of biology in the development of organisms.

Developmental Biology (Laboratory) (BIO654D)

1 unit

Ontogenetic development of vertebrates is studied in representative animals.

Evolutionary Biology (BIO509D)

3 units

This is a critique on the Theory of Evolution.

Major Courses:

Advanced Ecology Lecture (BIO601D)

2 units

This is a course which will build a foundation of knowledge in basic and applied ecology. It will provide a preview of the basic concepts in ecology and will emphasize on the applications of ecological principles to environmental issues. It will encompass topics on the physical environment, populations, communities, ecosystems to the global landscape scale, underpinned with concepts of inter-relationships, regulatory mechanisms and evolution. It will include lectures, discussions of case studies, computer sessions, field work and library research which will integrate the theoretical and practical framework of ecology.

Advanced Ecology Laboratory (BIO600D)

1 unit

This course will provide the practical framework of ecology. It will offer the venue for students to apply knowledge and develop skills in the investigation of basic and applied ecological problems. It will include computer sessions, field work and library research which will integrate the theoretical and practical aspects of ecology.

Advanced Genetics Lecture (BIO603D)

2 units

The course provides an in-depth study of the structure and function of the gene. It updates the students on the current trends and approaches in the study of genetics from the molecular to population genetics.

Advanced Genetics Laboratory (BIO602D)

1 unit

The course provides students a hand-on experience in studying various investigative approaches in genetics.

Advanced Molecular Biology Lecture (BIO611D)

2 units

This is a course that deals with basic principles and techniques of molecular biology and its applications in biotechnology. It deals with the structure and quantitative analysis. It introduces the basic concepts of plant, animal, and microbial biotechnology. It also trains the students in all biosafety aspects.

Advanced Molecular Biology Laboratory (BIO610D)

1 unit

This course is designed to introduce the practical aspects of basic molecular biology methods. It gives a hands-on experience to the students in performing the basic techniques of molecular biology, such as isolation and analysis of macromolecules and their properties, qualitative and quantitative analysis of major macromolecules (nucleic acids and proteins), as well as techniques of handling DNA vectors and bacterial cultures for transformation. It also trains the students in all biosafety aspects.

Advanced Physiology Lecture (BIO605D)

2 units

This course deals with the dynamic processes of growth and metabolism in living plants. In particular, discussions will focus on processes and component interactions at different levels of organization that enable plants to carry out its functions, the responses of plants to changes in the environment and the accompanying growth and development. The course also deals with the principles and mechanisms of vertebrate physiology with emphasis on human systems.

Advanced Physiology Laboratory (BIO604D)

1 unit

The course deals with some techniques used in physiological research and on some factors and processes affecting certain aspects of plant growth and development. It also covers principles and mechanisms of vertebrate physiology.

Advanced Systematics Lecture (BIO607D)

2 units

This covers principles of classification and phylogeny reconstruction.

Advanced Systematics Laboratory (BIO606D)

1 unit

This is a course that deals with taxonomic methods and techniques of phylogeny reconstruction.

Cell Biology (BIO609D)

3 units

This is a course that discusses the structure and functions of the different components of the cell at the molecular level. It also deals with the interaction among cells.

Elective Courses:

Advanced Microbiology Lecture (BIO631D)

2 units

The course involves the study of the anatomy, physiology, and genetics of microorganisms, in particular, those of typical and atypical bacteria.

Advanced Microbiology Laboratory (BIO632D)

2 units

The course covers the laboratory techniques in microbiology pertinent to the study of the physiology and identification of microorganisms. Advances in the diagnosis and control of microbial infections will also be discussed. Hand-on activities that emphasize the economic importance of selected bacteria and fungi will also be performed.

Advanced Parasitology Lecture (BIO635D)

2 units

This course deals with the current and comprehensive review of selected groups of zoonic parasites affecting man as well as animals of economic value. It discusses recent findings and advances in parasitology that assist in parasite detection and control of transmission.

Advanced Parasitology Laboratory (BIO636D)

1 unit

This course will provide students hands-on activities on collection and processing as well as examination of both live and prepared samples of major parasitic groups covered in the lecture. Advances in diagnosis and control of parasitic infection will also be discussed.

Biodiversity Conservation Lecture (BIO615D)

2 units

This course will provide students an introduction to the principles and practice of plant conservation in the world and local settings. It will include lectures, discussions of case studies, computer sessions, and library research which will integrate the theoretical and practical framework of plant conservation towards a wholistic approach to sustainable development.

Biodiversity Conservation Laboratory (BIO614D)

1 unit

This course will provide a venue for students to apply the principles of plant conservation in the local setting. It will include computer sessions, fieldwork, library and herbarium research which will integrate the theoretical and practical framework of plant conservation towards a wholistic approach to sustainable development.

Bioinformatics Lecture (BIO515D)

2 units

This is a course that discusses the theoretical concepts and rationale behind the use of computer technology as applied to biological data. This introduces the different available software programs for the management and processing data from molecular biology to ecology.

Bioinformatics Laboratory (BIO516D)

1 unit

This is a computer laboratory course which provides students hands-on applications of available software programs to biological data. Exercises include but not limited to biological data mining, phylogenetic construction, computer modeling and simulation of ecological/biological phenomena and ecosystem management.

Entomology Lecture (BIO659D)

2 units

This is a course dealing with the morphology and classification of insects.

Entomology Laboratory (BIO660D)

1 unit

This is a course that deals with the identification and classification of insects.

Food Microbiology Lecture (BIO639D)

2 units

The course focuses on the role of microorganisms in production, processing and preservation of food. It also discusses problems faced by the food industry pertaining to microbial contamination and the possible solutions.

Food Microbiology Laboratory (BIO640D)

1 unit

The course gives hands-on activities to appreciate the role of microorganisms on food production. It also provides protocols performed in food microbiology laboratory pertaining to quality monitoring, maintenance, and good laboratory practice.

Immunology (BIO633D)

3 units

This course involves familiarization with basic elements of the immune system and concepts/principles governing immune responses (natural and adaptive immunity); conventional and molecular/immunological or serological diagnostic tools/tests/assays of microbial and parasitic agents, including advances in the development of newer and more

specific and sensitive and rapid tests and in antigen/protein isolation, identification and functional profiling for potential use in diagnostics.

Limnology Lecture (BIO671D)

2 units

This is a course on the science of freshwater (physical, chemical and biological aspects). Topics focus on the ecology of freshwater plant and animal communities and characteristics of major freshwater habitats. Emphasis will be given on current environmental issues and concerns particularly how human activities affect the freshwater ecosystem.

Limnology Laboratory (BIO672D)

1 unit

This is a course which will cover practical laboratory and field activities on identification of freshwater organisms, measurement of freshwater parameters, and analysis of the relationships of the components of this ecosystem.

Microbial Ecology Lecture (BIO641M)

2 units

The course focuses on the role of microorganisms in the upkeep of the ecosystem. It discusses the impact of microbes in the biogeochemical cycles. Current use of microorganisms as pollution indicators and in bioremediation is also covered in this course.

Microbial Ecology Laboratory (BIO642D)

1 unit

This laboratory course explores the diversity of microorganisms in the environment. It also tackles the various methods in the isolation and characterization of these microorganisms, as well as their use in bioremediation and as pollution indicators.

Taxonomy and Morphology of Angiosperms Lecture (BIO625D)

2 units

This is a course which deals with the principles and practice of taxonomy or systematics and classification of flowering plants. It includes topics on history of taxonomy, botanical nomenclature, classical and modern methods of taxonomy, and the different schemes of classification of flowering plants.

Taxonomy and Morphology of Angiosperms Laboratory (BIO626D)

1 unit

This is a course which focuses on methods and techniques for morphological study and classification of the flowering plants. It includes laboratory and field activities and use of computer tools on plant identification, description and classification.

Special Problems in Botany (BIO719D)

3 units

The course involves the completion of a research work in Botany wherein primary data are generated. The output is a research paper.

Special Problems in Developmental Biology (BIO722D)

3 units

The course involves the completion of a research work in Developmental Biology wherein primary data are generated. The output is a research paper.

Special Problems in Genetics (BIO718D)

3 units

The course involves the completion of a research work in Genetics wherein primary data are generated. The output is a research paper.

Special Problems in Limnology (BIO720D)

3 units

The course involves the completion of a research work in Limnology wherein primary data are generated. The output is a research paper.

Special Problems in Marine Biology (BIO716D)

3 units

The course involves the completion of a research work in Marine Biology wherein primary data are generated. The output is a research paper.

Special Problems in Medical Microbiology (BIO726D)

3 units

The course involves the completion of a research work in Medical Microbiology wherein primary data are generated. The output is a research paper.

Special Problems in Medical Parasitology (BIO725D)

3 units

The course involves the completion of a research work in Medical Parasitology wherein primary data are generated. The output is a research paper.

Special Problems in Microbiology (BIO713D)

3 units

The course involves the completion of a research work in Microbiology wherein primary data are generated. The output is a research paper.

Special Problems in Molecular Genetics (BIO724D)

3 units

The course involves the completion of a research work in Molecular Genetics wherein primary data are generated. The output is a research paper.

Special Problems in Parasitology (BIO721D)

3 units

The course involves the completion of a research work in Parasitology wherein primary data are generated. The output is a research paper.

Special Problems in Physiology (BIO714D)

3 units

The course involves the completion of a research work in Physiology wherein primary data are generated. The output is a research paper.

Special Problems in Systematics (BIO723D)

3 units

The course involves the completion of a research work in Systematics wherein primary data are generated. The output is a research paper.

Special Problems in Terrestrial Ecology (BIO717D)

3 units

The course involves the completion of a research work in Terrestrial Ecology wherein primary data are generated. The output is a research paper.

Special Problems in Zoology (BIO715D)

3 units

The course involves the completion of a research work in Zoology wherein primary data are generated. The output is a research paper.

Research Seminar:

Research Seminar 1 (BIO906D)

1 unit

This is a course which will serve as a venue for presentation of the results of special problems or researches. Attendance to other seminars or scientific fora may also be required and credited to this course.

Research Seminar 2 (BIO907D)

1 unit

This is a course which will serve as a venue for presentation of the results of special problems or researches. Attendance to other seminars or scientific fora may also be required and credited to this course.

Dissertation:

Dissertation Writing I (BIO976D)

6 units

This course involves the completion of an acceptable proposal written under the supervision of a dissertation adviser and his/her co-adviser. The student must pass an oral defense of his/her proposal before the Dissertation Proposal Defense Panel.

Dissertation Writing II (BIO977D)

6 units

The course involves the execution of the dissertation research under the supervision of a dissertation adviser and his/her co-adviser.

Dissertation Writing III-XV (BIO978D-BIO990D)**0 unit**

The course involves the continuation of the research proper of the dissertation carried out under the supervision of a dissertation adviser and his/her co-adviser. The student may defend his dissertation before the Dissertation Defense Panel upon its completion and acceptance by the thesis adviser and co-adviser. The written dissertation should conform to the standards set by the department.