

## BACHELOR OF SCIENCE Biology

### Program Description

The Bachelor of Science in Biology program is structured as a generalized framework of study with the end view of grounding students with the fundamental concepts and principles and theories of the biological, natural and physical sciences and the conduct of research. This includes the acquisition of appropriate skills and training to prepare them for either medical studies, biological research, tertiary teaching, environmental & microbiological works. The curriculum consists of course work in the classroom, laboratory and field/community as well as on- the- job trainings.

### Program Educational Objectives:

Within three to five years after obtaining a bachelor's degree in BS Biology graduates are expected to:

1. Practice their scientific skills and knowledge as professionals in their fields of specialization in the service of the country and humanity as a whole through research, innovation and social engagement.
2. Pursue post-graduate studies or continuing education for professional development and /or actively engage in pro-active organizations that are committed to the shared mission of caring for the peoples and the Earth.
3. Assume managerial and influential roles as persons of excellence and integrity in their organizations and communities.

### Program Outcomes

By the time of graduation, the students of the program shall have developed the ability to:

1. Competently communicate orally and/or in writing, their acquired breadth of fundamental biological concepts and technical/analytical competencies using both Filipino and English in different settings and for various audiences to convey a message that is significant to society and the Church.
2. Engage in the generation of new knowledge and/or development projects in the field of biological sciences through involvement in the evidence-based processes of science, in search of a solution to a specific problem and subsequently disseminating results to individuals within and outside the biological discipline.
3. Collaborate with multi-disciplinary and multi-cultural teams to critically assess contemporary issues in biological thought and research, the contributions of biology to the resolution of diverse issues in human affairs, and the impact of these solutions in a global and societal context.
4. Preserve and promote Filipino historical and cultural heritage by conserving and protecting our natural resources, in the context of La Sallian spirituality.

### Admission Requirements

Admission to the program starts at the freshman year. To be admitted, a student (preferably from the STEM track) should:

1. meet the requirements for general admission to the university;
2. manifest serious interest in the natural sciences;
3. have a general weighted average of at least 85.0 in Grade 12.

### **Retention Policies**

To be retained in the BS Biology Program, a student should:

1. not incur failures in two major subjects in one semester; and
2. not have accumulated failures of 18 units or more.

**BACHELOR OF SCIENCE  
Biology**

**FIRST YEAR  
First Semester**

		<b>Lec Units</b>	<b># of hrs/wk</b>	<b>Lab Units</b>	<b># of hrs/wk</b>	<b>Total Credit</b>	<b>Total Assessed Units</b>
BBIO101A	General Botany Lecture	3	3	0	0	3	3
BBIO101L	General Botany Laboratory	0	0	2	6	2	6
BBIO102A	General Zoology Lecture	3	3	0	0	3	3
BBIO102L	General Zoology Laboratory	0	0	2	6	2	6
USELF	Understanding the Self	3	3	0	0	3	3
MATHMW	Mathematics in the Modern	3	3	0	0	3	3
PED1	Physical Education 1 (Wellness & Fitness)	2	2	0	0	2	2
IRS1	Lasallian Spirituality	3	3	0	0	3	3
NSTP1	National Service Learning	3	3	0	0	3	3
<b>Total</b>		<b>20</b>	<b>20</b>	<b>4</b>	<b>12</b>	<b>24</b>	<b>32</b>

**Second Semester**

		<b>Lec Units</b>	<b># of hrs/wk</b>	<b>Lab Units</b>	<b># of hrs/wk</b>	<b>Total Credit</b>	<b>Total Assessed Units</b>
BBIO106A1	Chemical Biology 1 Lecture (Analytical Methods)	3	3	0	0	3	3
BBIO106L	Chemical Biology 1 Laboratory (Analytical Methods)	0	0	1	3	1	3
BBIO111A	Genetics Lecture	3	3	0	0	3	3
BBIO111L	Genetics Laboratory	0	0	2	6	2	6
BBIO201B	Invertebrate Zoology	2	2	1	3	3	5
PCOM	Purposive Communication	3	3	0	0	3	3
PED2	Physical Education 1 (Team Sports & Rhythmic)	2	2	0	0	2	2
IRS2	Christian Morality	3	3	0	0	3	3
NSTP2	National Service Learning	3	3	0	0	3	3
IGG	Group Guidance	1.5	1.5	0	0	1.5	1.5
<b>Total</b>		<b>20.5</b>	<b>20.5</b>	<b>4</b>	<b>12</b>	<b>24.5</b>	<b>32.5</b>

**SECOND YEAR  
First Semester**

		<b>Lec Units</b>	<b># of hrs/wk</b>	<b>Lab Units</b>	<b># of hrs/wk</b>	<b>Total Credit</b>	<b>Total Assessed Units</b>
BBIO103A	Systematics Lecture	3	3	0	0	3	3
BBIO103L	Systematics Laboratory	0	0	2	6	2	6
BBIO104A	Chemical Biology 2 Lecture (Organic Molecules)	3	3	0	0	3	3
BBIO104L	Chemical Biology 2 Laboratory (Organic Molecules)	0	0	1	3	1	3
BBIO105	Statistical Biology	2	2	1	3	3	5
ETHICS	Ethics	3	3	0	0	3	3
IRS3	Spirituality in the WorkPlace	3	3	0	0	3	3
PED3	Physical Education 3 (Swimming & Recreation)	2	2	0	0	2	2
STS	Science, Technology & Society	3	3	0	0	3	3
<b>Total</b>		<b>19</b>	<b>19</b>	<b>4</b>	<b>12</b>	<b>23</b>	<b>31</b>

Second Semester		Lec Units	# of hrs/wk	Lab Units	# of hrs/wk	Total Credit Units	Total Assessed Units
B BIO109A	Chemical Biology 3 (Biomolecules) Lecture	3	3	0	0	3	3
B BIO109L	Chemical Biology 3 (Biomolecules) Laboratory	0	0	2	6	2	6
B BIO114A	BioPhysics Lecture	3	3	0	0	3	3
B BIO114L	BioPhysics Laboratory	0	0	1	3	1	3
	Mathematical Tools Fr Biology (Calculus)	3	0	0	0	3	3
ARTAP	Art Appreciation	3	0	0	0	3	3
LITE	Living in the IT Era	3	0	0	0	3	3
PED4	Physical Education 4 (Individual& Dual Sports)	2	2	0	0	2	2
	<b>Total</b>	<b>17</b>	<b>8</b>	<b>3</b>	<b>9</b>	<b>20</b>	<b>26</b>

Summer		Lec Units	# of hrs/wk	Lab Units	# of hrs/wk	Total Credit Units	Total Assessed Units
B BIO108A	General Ecology Lecture	3	3	0	0	3	3
B BIO108L	General Ecology Laboratory	0	0	2	6	2	6
B BIO202	Marine Biology	2	2	1	3	3	5
	<b>Total</b>	<b>5</b>	<b>5</b>	<b>3</b>	<b>9</b>	<b>8</b>	<b>14</b>

### THIRD YEAR First Semester

THIRD YEAR First Semester		Lec Units	# of hrs/wk	Lab Units	# of hrs/wk	Total Credit Units	Total Assessed Units
B BIO107A	General Microbiology Lecture	3	3	0	0	3	3
B BIO107L	General Microbiology Laboratory	0	0	2	6	2	6
B BIO113A	General Physiology Lecture	3	3	0	0	3	3
B BIO113L	General Physiology Laboratory	0	0	2	6	2	6
B BIO117	Thesis 1	2	2	0	0	2	2
B BIO203	Plant Physiology	2	2	1	3	3	5
RHIST	Readings in Philippine History	3	0	0	0	3	3
GENSOC	Gender & Society	3	3	0	0	3	3
	<b>Total</b>	<b>16</b>	<b>13</b>	<b>5</b>	<b>15</b>	<b>21</b>	<b>31</b>

### Second Semester

Second Semester		Lec Units	# of hrs/wk	Lab Units	# of hrs/wk	Total Credit Units	Total Assessed Units
B BIO110A	Evolutionary Biology Lecture	3	3	0	0	3	3
B BIO110L	Evolutionary Biology Laboratory	0	0	2	6	2	6
B BIO112A	Cell and Molecular Biology Lecture	3	3	0	0	3	3
B BIO112L	Cell and Molecular Biology Laboratory	0	0	2	6	2	6
B BIO118	Thesis 2	2	2	0	0	2	2
B BIO204	Genomics and Bioinformatics	2	2	1	3	3	5
CWRLD	The Contemporary World	3	3	0	0	3	3
	Data Science	3	3	0	0	3	3
	<b>Total</b>	<b>16</b>	<b>16</b>	<b>5</b>	<b>15</b>	<b>21</b>	<b>31</b>

### Summer

Summer		Lec Units	# of hrs/wk	Lab Units	# of hrs/wk	Total Credit Units	Total Assesse Units
B IOPRAC	Practicum	3	3	0	0	3	3
	<b>Total</b>	<b>3</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>3</b>

**FOURTH YEAR  
First Semester**

		<b>Lec</b>	<b># of</b>	<b>Lab</b>	<b># of</b>	<b>Total</b>	<b>Total</b>
		<b>Units</b>	<b>hrs/wk</b>	<b>Units</b>	<b>hrs/wk</b>	<b>Credit</b>	<b>Assessed</b>
						<b>Units</b>	<b>Units</b>
BBIO115A	Developmental Biology Lecture	3	3	0	0	3	3
BBIO115L	Developmental Biology	0	0	2	6	2	6
BBIO119	Thesis 3	2	2	0	0	2	2
BBIO205	Medical Microbiology and Parasitology	2	2	1	3	3	5
BBIO206	Human Anatomy and Physiology	3	3	1	3	4	6
FREELECT	Free Elective 1	3	3	0	0	3	3
	<b>Total</b>	<b>13</b>	<b>13</b>	<b>4</b>	<b>12</b>	<b>17</b>	<b>25</b>

**Second Semester**

		<b>Lec</b>	<b># of</b>	<b>Lab</b>	<b># of</b>	<b>Total</b>	<b>Total</b>
		<b>Units</b>	<b>hrs/wk</b>	<b>Units</b>	<b>hrs/wk</b>	<b>Credit</b>	<b>Assessed</b>
						<b>Units</b>	<b>Units</b>
BBIO207	Microbial Ecology	2	2	1	3	3	5
BBIO208	Environmental Chemistry and Toxicology	2	2	1	3	3	5
RIZAL	Life and Works of Rizal	3	0	0	0	3	3
GBOOKS	Great Books	3	3	0	0	3	3
FREELECT2	Free Elective 2	3	3	0	0	3	3
BBIO209	Seminars	0	0	0	0	0	0
	<b>Total</b>	<b>13</b>	<b>10</b>	<b>2</b>	<b>6</b>	<b>15</b>	<b>19</b>

## SUMMARY OF REQUIRED COURSES

### BS Biology

	No. of Total Course Units Required	Unit Equivalent
<b>General Education Courses</b>		
Languages		
Purposive Communication	1	3
Great Books	1	3
Mathematics		6
Mathematics in the Modern World	1	3
Social Sciences		
Understanding the self	1	3
Art Appreciation	1	3
GE Electives (Gender and Society)	1	3
		9
<b>Mandated Courses</b>		
Physical Education	4	8
Institutional Religious Studies	3	9
National Service Training Program	2	6
Institutional Group Guidance	1	1.5
The Contemporary World	1	3
Ethics	1	3
Science, Technology and Society	1	3
Logic	1	3
Rizal	1	3
Readings in Philippine History	1	3
Living in the IT Era	1	3
		45.5
<b>Fundamental Courses</b>		
BBIO101 General Botany	1	5
BBIO102 General Zoology	1	5
BBIO103 Systematics	1	5
BBIO107 Microbiology	1	5
BBIO108 General Ecology	1	5
BBIO110 Evolutionary Biology	1	5
BBIO111 Genetics	1	5
BBIO112 Cell and Molecular Biology	1	5
BBIO113 General Physiology	1	5
BBIO115 Developmental Biology	1	5
Thesis	3	6
		56
<b>Tool Courses</b>		
BBIO104 Chemical Biology 11	1	4
BBIO105 Statistical Biology	1	3
BBIO106 Chemical Biology 1	1	4
BBIO109 Chemical Biology 111	1	5
BBIO114 Biophysics	1	4
		20
<b>Specialization Courses</b>		
BIOELECT 1 Biology Elective 1	1	5
BIOELECT 2 Biology Elective 2	1	5
BIOELECT 3 Biology Elective 3	1	5
BIOELECT 4 Biology Elective 4	1	5
BIOELECT 5 Biology Elective 5	1	5
		25
<b>Free Elective Courses</b>		
Free Electives	2	6
<b>Practicum</b>	1	3
<b>TOTAL</b>		<b>173.5</b>

## Biology

### Electives

A BS Biology student may choose to pursue a specialized field, either in Medical Biology, Ecology, or Microbiology. The specialization electives that will be offered per semester is the department's prerogative based on the results of surveys which will be conducted every semester.

### FOR

#### ECOLOGY

BBIO201	Terrestrial Ecology and Limnology	1	5
BBIO202	Marine Ecology	1	5
BBIO203	Biogeography	1	5
BBIO204	Molecular Ecology	1	5
BBIO205	Environmental Chemistry & Toxicology	1	5
BBIO206	Biological Resource Management	1	5

#### FOR MEDICAL BIOLOGY

BBIO301	Medical Microbiology	1	5
BBIO302	Human Anatomy & Physiology	1	5
BBIO303	Medical Parasitology	1	5
BBIO304	Medical Histology	1	5
BBIO306	Epidemiology	1	5
BBIO307	Biomedical Devices and Instrumentation	1	5

#### FOR MICROBIOLOGY

BBIO301	Medical Microbiology	1	5
BBIO401	Microbial Physiology	1	5
BBIO403	Food Microbiology	1	5
BBIO404	Microbial Ecology	1	5
BBIO405	Industrial Microbiology	1	5

#### ELECTIVES COMMON TO ALL FIELDS

BBIO207	Biotechnology	1	5
BBIO208	Bioinformatics	1	5
BBio305	Fundamentals of Genomics	1	5

## MAJOR COURSE DESCRIPTION

### BS Biology

**BBIO101****5****units****GENERAL  
BOTANY**

Deals with the study of plants' external and internal form, organization, structure and function from cellular, histological up to organismic levels. The phylogenetic and ecological perspectives of plant study is used as the foundation for emphasizing the role of plants in our diverse environment and consequently elicit responsible attitude towards plants.

Students are expected to be able to confidently and thoroughly explain the morphoanatomy and physiology of plants. As Biology students, they are also expected to practice the scientific method in identifying problems in the ecosystems adopted by the class. Part of this exercise is to conduct a plant survey in selected areas and to generate scientific informations from the processed data, such as a list of plants that are valuable to people in the locale and to the ecosystem where the plants belong. Hence, as a way of communicating their findings to others within the La Sallian community, the students will be required to organize an event that will promote awareness of plant biodiversity and encourage advocacies for the conservation of our national resources and protection of our natural heritage.

Systematic study of the kinds and diversity of organisms (populations, species and higher taxa) and the relationships among them, determination by means of comparison of what the unique properties of each species and higher taxa are, properties certain taxon have in common and the biological causes of the difference or shared characteristics, study of variation within taxa.

Students will conduct field research to enhance their skills in critical thinking and scientific inquiry which will broaden their capacity to address environmental issues.

Prerequisite: BBIO101,  
BBIO102

**BBIO102****5****units****GENERAL  
ZOOLOGY**

Preparatory subject to higher biology and allied fields, it provides the foundation for exploration of the animal (structure and function), of which humans are part of. Highlights the understanding of lower forms of organisms to see the development of the human body.

Students will have awareness and interest of Philippine wildlife, particularly the endemic and endangered species. Each group will take photos of three animals of interest. Each of these animals will be studied in details through research, which the students will have to write up as background information of the animals they have selected. Both the photograph and the write up will be mounted on boards that will be displayed as an exhibit.

**BBIO103****5****units****SYSTEMATIC  
S**



**BBIO104** **4 units**  
**CHEMICAL BIOLOGY 2**  
**(ORGANIC MOLECULES)**

Deals with the fundamentals of Organic Chemistry, the study of carbon and its various compounds. It covers structure writing and structure nomenclature of the different classes of organic compounds as well as their properties and derivatives. It helps them to think critically and logically and apply scientific concepts to any phenomenon that occurs in nature.

The students will master the skills required in the manipulation of apparatus as well as techniques employed in chemical analyses and to apply the roles played by organic chemistry in the daily life.

**BBIO105** **3**  
**units**  
**STATISTICAL**  
**BIOLOGY**

Includes a review of statistics and the appropriate statistical tools needed for biological /medical research.

Students will easily apply statistical tools needed for specific research problems that they propose as part of their subject requirements.

**BBIO106** **4 units**  
**CHEMICAL BIOLOGY 1**  
**(ANALYTICAL METHODS)**

Covers the theory and practice of chemical analysis. It includes the qualitative analysis of cations and anions as well as gravimetric and volumetric methods of analysis.

Given a set of unknown solutions, the students are expected to correctly perform laboratory laboratory procedures for chemical analysis to enable them to predict the substances present in their sample.

**BBIO107** **5**  
**units**  
**MICROBIOLO**  
**GY**

Covers anatomy, physiology and genetics of microorganisms such as bacteria, fungi algae and protozoans. It also involves the study of the roles of microorganism in the environment and their applications in industry and medicine. Experiments are designed to include techniques for identification of microorganisms. Students will be trained in the use of aseptic techniques for basic microbial applications.

The students are expected to participate in

---

the community service learning program wherein they act as lecturers about disease, health and sanitation and medical mission organized by students themselves.

**BBIO108** 5  
units  
**GENERAL  
ECOLOGY**

An introductory course on the biology of ecosystems. It consists of laboratory work dealing with basic principles and methodologies pertaining to population and community structure and the assessment of environmental quality.

Students will have technical skills in environmental assessments, conduct field assessment of a selected site to highlight an environmental issue and exhibit research skills and write a scientific paper which will be presented orally as a course output.

Prerequisite: BBIO103,  
BBIO105

**BBIO109** 5 units  
**CHEMICAL BIOLOGY 3  
(BIOMOLECULES)**

Focuses on the study of the structures, functions, reactions, and metabolism of the four major classes of biomolecules namely, carbohydrates, lipids, nucleic acids, and proteins.

Students will master chemical interactions that are taking place within the body of the living organisms in general and recognize the the significance and the beauty of life processes. They should be able to explain the emergence of certain diseases in the context of disruption and imbalances in the different metabolic pathways and suggest ways to prevent them.

Prerequisite:  
BBIO104

**BBIO110** 5  
units  
**EVOLUTIONARY  
BIOLOGY**

Deals with evolutionary relationships among different biological organisms.

Students will clearly communicate evolutionary relationships among different biological organisms and predict possible linkages between and among the different organisms.

Prerequisite:  
BBIO108

**BBIO111** 5  
units  
**GENETIC  
S**

Includes mechanism of heredity and variation, cytogenetics, mutation, nature of genetics, population genetics, human genetics and evolutionary genetics as well as biometrical procedures.

Students will collaborate on organizing a local support group for families with members afflicted with a genetic disease. They will also create an e-group detailing its medical interventions and specialists for the consultation.

**BBIO112** 5  
units  
**CELL AND MOLECULAR  
BIOLOGY**

This course covers discussions on the cell, the basic unit of life. Emphasis will be placed on the structural features of the different cellular organelles, connections of the basic cellular processes and the importance of biomolecule properties for their control and regulation.

Students are required to write and orally report a synopsis of current relevant literature material on selected topics on cell and molecular biology. Prerequisite: BBIO109

**BBIO113** **5**  
**units**

**GENERAL  
PHYSIOLOGY**

Deals with the fundamental principles of biological functions observed for the members of the plant and animal kingdoms. Particular emphasis is placed on the processes involved with regulation and adaptation to different stimuli.

Students will come up with a model showing how an organ looks and works and present this to the class as well to a chosen group in the community or school.

Prerequisite: BBIO101,  
BBIO102

**BBIO114** **4**  
**units**

**BIOPHYSIC  
S**

Deals with the basic principles of mechanics, electricity, magnetism, optics and other important physical concepts and their applications to Biology.

Students will develop critical thinking ability on any phenomenon which occurs in nature by being able to link the concepts being studied to the everyday world and to the wider scientific world.

**BBIO115** **5**  
**units**

**DEVELOPMENTAL  
BIOLOGY**

Comparative survey of the development of representative plants and animals from several phyla, with emphasis on vertebrate gamete formation, fertilization, embryonic development, organogenesis, growth, and biological aging. The course is streamlined to integrate salient morphological, experimental, molecular and conceptual approaches to the study of developmental biology of both plants and animals.

Students will be able to demonstrate cognitive and psychological attributes essential to forming intelligent decisions when confronted with prevailing ethical and political issues affecting human life.

**THESIS (1,2,3)** **6 units**

Research proposal making, data gathering, and research final defense, as well as presentation of students' thesis, attendance to trainings, community

service learning program, workshops related to research, and other relevant issues in their specializations.

**BIOPRAC** **3 units**

Maximum of 150 hours of work immersion in institutions/industries related to their field of specialization.

**BBIO201B** **5**

**units**  
**INVERTEBRATE  
ZOOLOGY**

Makes a survey of the structure and physiology of various invertebrate taxonomic groups.

**BBIO202** 5  
units  
**MARINE  
BIOLOGY**

In depth study of marine ecosystems with field work/studies.

Students are expected to submit research outputs from their field works. Participation in the field trips and lectures/seminars given by invited resource speakers are also required.

**BBIO203** 5  
units  
**PLANT  
PHYSIOLOGY**

Covers principles and fundamental aspects of vital plant functions, growth and development with emphasis on adaptive mechanism.

**BBIO204** 5  
units  
**GENOMICS W/  
BIOINFROMATICS**

Studies genomes at a whole genome level by integrating the five traditional disciplines of genetics – Mendelian, Cytology, Molecular, Population, and Quantitative – with new technology from informatics and automated systems.

This course will provide a basic understanding of how gene sequence analysis works and how to implement appropriate algorithms and techniques for metadata sequence analysis, predicting biological functions and discovery based on genetic sequences.

**BBIO205** 5 units  
**MEDICAL MICROBIOLOGY &  
PARASITOLOGY**

This is a specialized course focused on the clinical and diagnostic features of pathogenic microorganisms. It deals with the body system approach in the study of the mechanism of causing diseases, prevention, and treatment as well as host-parasite relationship affecting man.

**BBIO206** 5  
units  
**HUMAN ANATOMY &  
PHYSIOLOGY**

Provides a basic foundation for medicine. It focuses on the gross anatomical structures and functions and is approached either regionally or systematically using models preserved specimens or pictures.

Students should be able to locate and identify the different components of an anatomic system or region and the different parts of an organ. They are

required to submit creative projects to demonstrate knowledge in anatomy and physiology.

**BBIO207** 5  
units  
**MICROBIAL  
ECOLOGY**

Deals with different types of microorganisms in their different habitats across the environments and assess the roles they play in sustaining biodiversity.

**BBIO208** **5 units**  
**ENVIRONMENTAL CHEMISTRY &**  
**TOXICOLOGY**

Studies chemical properties of the environment, as well as chemical reactions that drive natural environment processes. Included also are the discussions on environmental pollution, waste management, and chemical analyses applied in environmental monitoring and evaluating environmental quality. This course also introduces

students to the basics of toxicology and risk assessment, and radioactive and hazardous wastes and their disposal.

**BBIO209** **0**  
**units**  
**SEMINAR**  
**S**

Students are required to submit certificate and other documents as proof of attendance and presentation of research papers in conference (local, national and international)