

# COLLEGE OF NATURAL AND APPLIED SCIENCES

## BIOLOGY PROGRAM

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### PROSPECTUS

#### The Field

Biology is the study of living systems ranging from the chemical and physical underpinnings of all universal phenomena to the inner workings of the cell to organismal level inquiry and the complexities of populations, ecosystems, and biomes. The biological sciences encompass a broad, but interrelated, range of disciplines that lead to an equally diverse range of career paths.

#### Relevance and Demand

The world is experiencing a revolution in the biological disciplines as we have uncovered the genetic mechanisms by which it operates and the technology to manipulate them has become astonishingly rapid and cost-effective. These developments -- along with a greater understanding of complex biological systems -- have increased, and will continue to increase, our understanding of the biological world as well as allow this information to inform and drive improvements directly affecting humanity.

#### Why UOG?

UOG's Biology Program is unique as a result of our geographic placement that allows unequalled access to tropical organisms and ecosystems. We have purposefully designed our curriculum to take advantage of this and attract students from all over our region and worldwide. We also have purposefully incorporated a hands-on, research-focused approach from our foundational to capstone courses and believe this context prepares our students for real-world applications.

Given the relevance of the program's disciplines to Guam's sustainability, we actively develop our courses to both interest and accommodate students from other disciplines at both the lower and upper division levels. The Biology Program curriculum provides graduates with

education, work, and training experiences designed to guide them into becoming professionals and leaders in Guam, the Western Pacific, and globally.

In support of its mission, the Biology unit encourages faculty capacity building in teaching-learning, assessment, research, and service. Mentoring assists students and faculty to achieve their potential.

#### Career and Post-Graduate Possibilities

An undergraduate degree in Biology offers inroads to many career paths dealing with our people and environment as well as to furthering careers that will ultimately produce all manner of health professionals. Biology majors have opportunities for undergraduate research experiences through laboratory classes, work as lab technicians, independent study projects, and guided original research.

Those who want to pursue post-graduate studies in the biological sciences will be prepared to compete for entry into demanding graduate programs at first-rate institutions worldwide.

#### Offerings for Non-Majors

The program provides courses for non-majors as well, including those majoring in Nursing, Agriculture & Life Sciences, and HPERD. The Biology Program also assists the Education program in training science teachers and enables students to meet the STEM goals of General Education requirements.

### LEARNING OUTCOMES

#### 1. **Disciplinary knowledge and skills:**

Graduates use their knowledge and understanding of essential concepts to solve problems in ecology, genetics, molecular biology, systematics, and evolution. They can apply their biology knowledge and skills to locally important issues such as island

biogeography, conservation, and endangered species problems. They apply relevant concepts from chemistry and physics to biology problems.

**2. Quantitative skills:**

Graduates apply numerical methods in research design and use computers for analysis manipulating and modeling biological data.

**3. Research/laboratory skills:**

Graduates are competent in basic biology procedures and safety in the laboratory and the field; they formulate testable hypotheses and create effective experimental designs using their knowledge, understanding, and practical experience of scientific instruments.

**4. Communication skills:**

Graduates use scientific literature and diagrams as a source of information, properly cite sources and avoid plagiarism, and create text and graphics to communicate results effectively through print and oral presentations. They collect and assess evidence and use it to create effective arguments in writing scientific reports and proposals.

**5. Digital literacy:**

Graduates use and process information in multiple formats via computer. Graduates are competent in the following computer skills as related to their science work: desktop competencies, word processing, presentation, and data retrieval and manipulation. Graduates effectively judge the usefulness and accuracy of external sources of information.

**6. Professionalism:**

Graduates work effectively together in teams in a laboratory and field settings and follow ethical principles underlying scientific research and publication. Graduates understand and apply the values and limitations of scientific research in addressing public policy issues.



## TRACKS

### BIOLOGY TRACKS

#### Integrative Biology

This track prepares students for a graduate degree in a biological science or a broad range of careers in the biological sciences. This track leads to the greatest number of opportunities in biology.

#### Bio-Medical

This track is for Biology majors intending to pursue medical, dental, pharmacy, veterinary school, or graduate school in biomedical research.

#### Applied Biology

This track is for Biology majors intending to begin an applied biology career at an introductory level with a government agency, consulting firm, medical testing lab, or educational venue. Although flexible, this track will not prepare students for graduate studies in the biological sciences, medicine, pharmacy, dentistry, or veterinary sciences.

### BIOLOGY MINOR

Students may choose to minor in Biology for various reasons that broaden and strengthen their preparation and make them more competitive in their chosen fields. Students desiring entry into programs offering medical degrees who major in disciplines other than Biology find that they will need many Biology courses in order to compete and adding a Biology minor serves this purpose. Students in other majors have added the Biology minor in order to supplement their experience and allow them to specialize in a biologically focused area of their major

studies, in such broad areas as education, business, and chemistry.

### DEGREE REQUIREMENTS

### MAJOR REQUIREMENTS

Students considering majoring in Biology should meet with the [CNAS academic advisor](#) for advising as early as possible in their college career.

In all three tracks, first-year students begin by taking BI-100/BI-100L Environmental Biology lecture and lab in the fanucha#nan (Aug.–Dec.) semester followed by BI-157/BI-157L Principles of Biology I lecture and lab in the subsequent fan#omna#kan (Jan.–May) semester. In fanucha#nan of the second year, students take BI-158/BI-158L Principles of Biology II lecture and lab along with BI-315/BI-315L Genetics lecture and lab.

Biology majors must have a "C" or better in all courses required for the major and must have a "C" or better in prerequisite coursework for biology courses.

### INTEGRATIVE BIOLOGY TRACK (86–88 CREDIT HOURS)

#### General Education (Recommended Courses)

#### Tier II: Diversity Foundation:

Creative & Expressive Arts:

Course	Course Title	Credits	Term Offered
EN210	INTRODUCTION TO LITERATURE	3	FALL/SPRING/ ALL YEARS

## Required Courses (74-75 credit hours)

Course	Course Title	Credits	Term Offered
BI100	ENVIRONMENTAL BIOLOGY	3	FALL/SPRING/ ALL YEARS
BI100L	ENVIRONMENTAL BIOLOGY LABORATORY	1	FALL/SPRING/ ALL YEARS
BI157	PRINCIPLES OF BIOLOGY I	3	SPRING ONLY/ ALL YEARS
BI157L	PRINCIPLES OF BIOLOGY I LABORATORY	1	SPRING ONLY/ ALL YEARS
BI158	PRINCIPLES OF BIOLOGY II	3	FALL ONLY/ ALL YEARS
BI158L	PRINCIPLES OF BIOLOGY II LABORATORY	1	FALL ONLY/ ALL YEARS
BI310	EVOLUTION	3	SPRING ONLY/ ALL YEARS
BI315	GENERAL GENETICS	3	FALL ONLY/ ALL YEARS
BI315L	GENERAL GENETICS LABORATORY	1	FALL ONLY/ ALL YEARS
BI320	SCIENTIFIC REPORT WRITING	2	SPRING ONLY/ ALL YEARS
BI321	SCIENTIFIC ARGUMENTS	2	SPRING ONLY/ ALL YEARS
BI412	BIOMETRICS	3	FALL ONLY/ ALL YEARS
BI412L	BIOMETRICS LABORATORY	1	FALL ONLY/ ALL YEARS
CH102	GENERAL CHEMISTRY	3	FALL ONLY/ ALL YEARS

Course	Course Title	Credits	Term Offered
CH102L	GENERAL CHEMISTRY LABORATORY	1	FALL ONLY/ ALL YEARS
CH103	GENERAL CHEMISTRY	3	SPRING ONLY/ ALL YEARS
CH103L	GENERAL CHEMISTRY LABORATORY	1	SPRING ONLY/ ALL YEARS
CH310A	ORGANIC CHEMISTRY	3	FALL ONLY/ ALL YEARS
CH310B	ORGANIC CHEMISTRY	3	SPRING ONLY/ ALL YEARS
CH311	BASIC LABORATORY TECHNIQUES IN ORGANIC CHEMISTRY	2	FALL ONLY/ ALL YEARS
CH312	LABORATORY TECHNIQUES IN ORGANIC CHEMISTRY	2	SPRING ONLY/ ALL YEARS
MA203	CALCULUS I	5	FALL/SPRING/ ALL YEARS
PH251	UNIVERSITY PHYSICS	4	FALL ONLY/ ALL YEARS
PH252	UNIVERSITY PHYSICS	4	SPRING ONLY/ ALL YEARS

### Choice of (3 credit hours):

Course	Course Title	Credits	Term Offered
BI392	LABORATORY TEACHING AND ASSISTING	1 - 3	FALL/SPRING/ ALL YEARS

Or:

BI-390 Special Project

BI-398 Internship

BI-498 Internship

**Choice of (4 credit hours):**

Course	Course Title	Credits	Term Offered
BI302	PLANT BIOLOGY	3	FALL ONLY/ EVEN YEARS
BI302L	PLANT BIOLOGY LABORATORY	1	FALL ONLY/ EVEN YEARS
BI365	PLANT SYSTEMATICS	3	SPRING ONLY/ EVEN YEARS
BI365L	PLANT SYSTEMATICS LABORATORY	1	SPRING ONLY/ EVEN YEARS

**Choice of (4 credit hours):**

Course	Course Title	Credits	Term Offered
BI303	INVERTEBRATE ZOOLOGY	3	SPRING ONLY/ ODD YEARS
BI303L	INVERTEBRATE ZOOLOGY LABORATORY	1	SPRING ONLY/ ODD YEARS
BI333	COMPARATIVE VERTEBRATE ANATOMY	3	FALL ONLY/ ODD YEARS
BI333L	COMPARATIVE VERTEBRATE ANATOMY LABORATORY	1	FALL ONLY/ ODD YEARS
BI475	ADVANCE ANIMAL PHYSIOLOGY	3	SPRING ONLY/ ALL YEARS
BI475L	ADVANCED ANIMAL PHYSIOLOGY LABORATORY	1	SPRING ONLY/ ALL YEARS

**Choice of (5-6 credit hours):**

Course	Course Title	Credits	Term Offered
MA161A	COLLEGE ALGEBRA AND TRIGONOMETRY	3	FALL/SPRING/ ALL YEARS
MA161B	COLLEGE ALGEBRA AND TRIGONOMETRY	3	FALL/SPRING/ ALL YEARS
MA165	PRECALCULUS	5	FALL/SPRING/ ALL YEARS

BI-100/L, BI-157/L, BI-158/L, and CH-102/L may also fulfill [General Education requirements](#).

May not be double counted as required, elective, or capstone courses.

### Track-Specific Elective Courses (8 credit hours)

Elective courses cannot double count as track required courses. Other elective courses not listed here must be upper division science courses and approved by student's advisor and program chair.

Course	Course Title	Credits	Term Offered
BI225	BASIC MICROBIOLOGY	3	FALL ONLY/ ALL YEARS
BI225L	BASIC MICROBIOLOGY LABORATORY	1	FALL ONLY/ ALL YEARS
BI302	PLANT BIOLOGY	3	FALL ONLY/ EVEN YEARS
BI302L	PLANT BIOLOGY LABORATORY	1	FALL ONLY/ EVEN YEARS
BI303	INVERTEBRATE ZOOLOGY	3	SPRING ONLY/ ODD YEARS
BI303L	INVERTEBRATE ZOOLOGY LABORATORY	1	SPRING ONLY/ ODD YEARS
BI323	PLANT PATHOLOGY	3	FALL ONLY/ EVEN YEARS
BI323L	PLANT PATHOLOGY LAB	1	FALL ONLY/ EVEN YEARS
BI333	COMPARATIVE VERTEBRATE ANATOMY	3	FALL ONLY/ ODD YEARS
BI333L	COMPARATIVE VERTEBRATE ANATOMY LABORATORY	1	FALL ONLY/ ODD YEARS
BI350	ETHOLOGY	3	SPRING ONLY/ ALL YEARS
BI350L	ETHOLOGY LABORATORY	1	SPRING ONLY/ ALL YEARS
BI365	PLANT SYSTEMATICS	3	SPRING ONLY/ EVEN YEARS
BI365L	PLANT SYSTEMATICS LABORATORY	1	SPRING ONLY/ EVEN YEARS

Course	Course Title	Credits	Term Offered
BI345	GENERAL ENTOMOLOGY	3	FALL ONLY/ ODD YEARS
BI345L	GENERAL ENTOMOLOGY LABORATORY	1	FALL ONLY/ ODD YEARS
BI380	OCEANOGRAPHY	3	FALL ONLY/ ALL YEARS
BI380L	OCEANOGRAPHY LABORATORY	1	FALL ONLY/ ALL YEARS
BI410	ECOLOGY	3	SPRING ONLY/ ALL YEARS
BI410L	ECOLOGY LABORATORY	2	SPRING ONLY/ ALL YEARS
BI416	CELLULAR & MOLECULAR BIOLOGY	3	SPRING ONLY/ ALL YEARS
BI416L	CELLULAR & MOLECULAR BIOLOGY LABORATORY	1	SPRING ONLY/ ALL YEARS
BI419	BIOCHEMISTRY	3	SPRING ONLY/ ALL YEARS
BI419L	BIOCHEMISTRY LABORATORY	1	SPRING ONLY/ ALL YEARS
BI425	MOLECULAR MEDICINE	3	SPRING ONLY/ ODD YEARS
BI425L	MOLECULAR MEDICINE LABORATORY	2	SPRING ONLY/ ODD YEARS
BI430	SCIENTIFIC PHOTOGRAPHY	3	SPRING ONLY/ EVEN YEARS
BI430L	SCIENTIFIC PHOTOGRAPHY LABORATORY	1	
BI432	PHARMACOLOGY	3	FALL ONLY/ ODD YEARS

Course	Course Title	Credits	Term Offered
BI474	MARINE BOTANY	4	SPRING ONLY/ ODD YEARS
BI475	ADVANCE ANIMAL PHYSIOLOGY	3	SPRING ONLY/ ALL YEARS
BI475L	ADVANCED ANIMAL PHYSIOLOGY LABORATORY	1	SPRING ONLY/ ALL YEARS
GE480	SPECIAL TOPICS IN GEOGRAPHY	3	SPRING ONLY/ ALL YEARS

### Capstone (4-5 credit hours)

Choice of:

Course	Course Title	Credits	Term Offered
BI410	ECOLOGY	3	SPRING ONLY/ ALL YEARS
BI410L	ECOLOGY LABORATORY	2	SPRING ONLY/ ALL YEARS
BI475	ADVANCE ANIMAL PHYSIOLOGY	3	SPRING ONLY/ ALL YEARS
BI475L	ADVANCED ANIMAL PHYSIOLOGY LABORATORY	1	SPRING ONLY/ ALL YEARS

Note: Biology capstone cannot double count as Integrative Biology required or elective courses.

## BIO-MEDICAL TRACK (90-91 CREDIT HOURS)

### General Education (Recommended Courses)

#### Tier II: Diversity Foundation

Human Sciences:

Course	Course Title	Credits	Term Offered
PY101	GENERAL PSYCHOLOGY	3	FALL/SPRING/ ALL YEARS
SO101	INTRODUCTION TO SOCIOLOGY	3	FALL/SPRING/ ALL YEARS

Creative & Expressive Arts:

Course	Course Title	Credits	Term Offered
EN210	INTRODUCTION TO LITERATURE	3	FALL/SPRING/ ALL YEARS

### Required Courses (82-83 credit hours)

Course	Course Title	Credits	Term Offered
BI100	ENVIRONMENTAL BIOLOGY	3	FALL/SPRING/ ALL YEARS
BI100L	ENVIRONMENTAL BIOLOGY LABORATORY	1	FALL/SPRING/ ALL YEARS
BI124	HUMAN ANATOMY AND PHYSIOLOGY I	3	FALL ONLY/ ALL YEARS
BI124L	HUMAN ANATOMY & PHYSIOLOGY I LABORATORY	1	FALL ONLY/ ALL YEARS
BI125	HUMAN ANATOMY & PHYSIOLOGY II	3	SPRING ONLY/ ALL YEARS
BI125L	HUMAN ANATOMY & PHYSIO II LABORATORY	1	SPRING ONLY/ ALL YEARS
BI157	PRINCIPLES OF BIOLOGY I	3	SPRING ONLY/ ALL YEARS
BI157L	PRINCIPLES OF BIOLOGY I LABORATORY	1	SPRING ONLY/ ALL YEARS
BI158	PRINCIPLES OF BIOLOGY II	3	FALL ONLY/ ALL YEARS
BI158L	PRINCIPLES OF BIOLOGY II LABORATORY	1	FALL ONLY/ ALL YEARS
BI310	EVOLUTION	3	SPRING ONLY/ ALL YEARS
BI315	GENERAL GENETICS	3	FALL ONLY/ ALL YEARS
BI315L	GENERAL GENETICS LABORATORY	1	FALL ONLY/ ALL YEARS



Course	Course Title	Credits	Term Offered
BI320	SCIENTIFIC REPORT WRITING	2	SPRING ONLY/ ALL YEARS
BI321	SCIENTIFIC ARGUMENTS	2	SPRING ONLY/ ALL YEARS
BI225	BASIC MICROBIOLOGY	3	FALL ONLY/ ALL YEARS
BI225L	BASIC MICROBIOLOGY LABORATORY	1	FALL ONLY/ ALL YEARS
BI416	CELLULAR & MOLECULAR BIOLOGY	3	SPRING ONLY/ ALL YEARS
BI416L	CELLULAR & MOLECULAR BIOLOGY LABORATORY	1	SPRING ONLY/ ALL YEARS
BI419	BIOCHEMISTRY	3	SPRING ONLY/ ALL YEARS
BI419L	BIOCHEMISTRY LABORATORY	1	SPRING ONLY/ ALL YEARS
CH102	GENERAL CHEMISTRY	3	FALL ONLY/ ALL YEARS
CH102L	GENERAL CHEMISTRY LABORATORY	1	FALL ONLY/ ALL YEARS
CH103	GENERAL CHEMISTRY	3	SPRING ONLY/ ALL YEARS
CH103L	GENERAL CHEMISTRY LABORATORY	1	SPRING ONLY/ ALL YEARS
CH310A	ORGANIC CHEMISTRY	3	FALL ONLY/ ALL YEARS
CH310B	ORGANIC CHEMISTRY	3	SPRING ONLY/ ALL YEARS
CH311	BASIC LABORATORY	2	FALL ONLY/ ALL YEARS

Course	Course Title	Credits	Term Offered
	TECHNIQUES IN ORGANIC CHEMISTRY		
CH312	LABORATORY TECHNIQUES IN ORGANIC CHEMISTRY	2	SPRING ONLY/ ALL YEARS
MA203	CALCULUS I	5	FALL/SPRING/ ALL YEARS
PH251	UNIVERSITY PHYSICS	4	FALL ONLY/ ALL YEARS
PH252	UNIVERSITY PHYSICS	4	SPRING ONLY/ ALL YEARS

**Choice of (3 credit hours):**

Course	Course Title	Credits	Term Offered
BI392	LABORATORY TEACHING AND ASSISTING	1 - 3	FALL/SPRING/ ALL YEARS

Or:

BI-390 Special Project

BI-398 Internship

BI-498 Internship

**Choice of (5-6 credit hours):**

Course	Course Title	Credits	Term Offered
MA165	PRECALCULUS	5	FALL/SPRING/ ALL YEARS
MA161A	COLLEGE ALGEBRA AND TRIGONOMETRY	3	FALL/SPRING/ ALL YEARS
MA161B	COLLEGE ALGEBRA AND TRIGONOMETRY	3	FALL/SPRING/ ALL YEARS

BI-100/L, BI-157/L, BI-158/L, and CH-102/L may also fulfill [General Education requirements](#).

Any upper division [Biology \(BI\)](#) course or other [Chemistry \(CH\)](#) or [Health Sciences \(HS\)](#) course approved by the Biology Program chair.

**Track-Specific Elective Courses (4 credit hours)**

Course	Course Title	Credits	Term Offered
BI302	PLANT BIOLOGY	3	FALL ONLY/ EVEN YEARS
BI302L	PLANT BIOLOGY LABORATORY	1	FALL ONLY/ EVEN YEARS
BI303	INVERTEBRATE ZOOLOGY	3	SPRING ONLY/ ODD YEARS
BI303L	INVERTEBRATE ZOOLOGY LABORATORY	1	SPRING ONLY/ ODD YEARS
BI323	PLANT PATHOLOGY	3	FALL ONLY/ EVEN YEARS
BI323L	PLANT PATHOLOGY LAB	1	FALL ONLY/ EVEN YEARS
BI333	COMPARATIVE VERTEBRATE ANATOMY	3	FALL ONLY/ ODD YEARS
BI333L	COMPARATIVE VERTEBRATE ANATOMY LABORATORY	1	FALL ONLY/ ODD YEARS
BI350	ETHOLOGY	3	SPRING ONLY/ ALL YEARS
BI350L	ETHOLOGY LABORATORY	1	SPRING ONLY/ ALL YEARS
BI345	GENERAL ENTOMOLOGY	3	FALL ONLY/ ODD YEARS
BI345L	GENERAL ENTOMOLOGY LABORATORY	1	FALL ONLY/ ODD YEARS
BI365	PLANT SYSTEMATICS	3	SPRING ONLY/ EVEN YEARS

Course	Course Title	Credits	Term Offered
BI365L	PLANT SYSTEMATICS LABORATORY	1	SPRING ONLY/ EVEN YEARS
BI380	OCEANOGRAPHY	3	FALL ONLY/ ALL YEARS
BI380L	OCEANOGRAPHY LABORATORY	1	FALL ONLY/ ALL YEARS
BI410	ECOLOGY	3	SPRING ONLY/ ALL YEARS
BI410L	ECOLOGY LABORATORY	2	SPRING ONLY/ ALL YEARS
BI412	BIOMETRICS	3	FALL ONLY/ ALL YEARS
BI412L	BIOMETRICS LABORATORY	1	FALL ONLY/ ALL YEARS
BI425	MOLECULAR MEDICINE	3	SPRING ONLY/ ODD YEARS
BI425L	MOLECULAR MEDICINE LABORATORY	2	SPRING ONLY/ ODD YEARS
BI430	SCIENTIFIC PHOTOGRAPHY	3	SPRING ONLY/ EVEN YEARS
BI430L	SCIENTIFIC PHOTOGRAPHY LABORATORY	1	
BI432	PHARMACOLOGY	3	FALL ONLY/ ODD YEARS
HS405	EPIDEMIOLOGY	3	FALL/SPRING/ ALL YEARS
HS322	KINESIOLOGY	3	FALL ONLY/ ALL YEARS
CH350	FOUNDATIONS OF PHYSICAL CHEMISTRY	3	FALL ONLY/ ALL YEARS
CH350L	FOUNDATIONS OF PHYSICAL	1	FALL ONLY/ ALL YEARS

Course	Course Title	Credits	Term Offered
	CHEMISTRY LABORATORY		

### Capstone Course (4 credit hours)

Course	Course Title	Credits	Term Offered
BI475	ADVANCE ANIMAL PHYSIOLOGY	3	SPRING ONLY/ ALL YEARS
BI475L	ADVANCED ANIMAL PHYSIOLOGY LABORATORY	1	SPRING ONLY/ ALL YEARS

## APPLIED BIOLOGY TRACK (87-89 CREDIT HOURS)

### General Education (Recommended Courses)

#### Tier II: Diversity Foundation

Creative & Expressive Arts:

Course	Course Title	Credits	Term Offered
EN210	INTRODUCTION TO LITERATURE	3	FALL/SPRING/ ALL YEARS

## Required Courses (55-56 credit hours)

Course	Course Title	Credits	Term Offered
BI100	ENVIRONMENTAL BIOLOGY	3	FALL/SPRING/ ALL YEARS
BI100L	ENVIRONMENTAL BIOLOGY LABORATORY	1	FALL/SPRING/ ALL YEARS
BI157	PRINCIPLES OF BIOLOGY I	3	SPRING ONLY/ ALL YEARS
BI157L	PRINCIPLES OF BIOLOGY I LABORATORY	1	SPRING ONLY/ ALL YEARS
BI158	PRINCIPLES OF BIOLOGY II	3	FALL ONLY/ ALL YEARS
BI158L	PRINCIPLES OF BIOLOGY II LABORATORY	1	FALL ONLY/ ALL YEARS
BI310	EVOLUTION	3	SPRING ONLY/ ALL YEARS
BI315	GENERAL GENETICS	3	FALL ONLY/ ALL YEARS
BI315L	GENERAL GENETICS LABORATORY	1	FALL ONLY/ ALL YEARS
BI320	SCIENTIFIC REPORT WRITING	2	SPRING ONLY/ ALL YEARS
BI321	SCIENTIFIC ARGUMENTS	2	SPRING ONLY/ ALL YEARS
BI412	BIOMETRICS	3	FALL ONLY/ ALL YEARS
BI412L	BIOMETRICS LABORATORY	1	FALL ONLY/ ALL YEARS
CH101	INTRODUCTION TO ORGANIC CHEMISTRY	3	FALL/SPRING/ ALL YEARS

Course	Course Title	Credits	Term Offered
CH101L	INTRODUCTION TO ORGANIC CHEMISTRY LABORATORY	1	FALL/SPRING/ ALL YEARS
CH102	GENERAL CHEMISTRY	3	FALL ONLY/ ALL YEARS
CH102L	GENERAL CHEMISTRY LABORATORY	1	FALL ONLY/ ALL YEARS
CH103	GENERAL CHEMISTRY	3	SPRING ONLY/ ALL YEARS
CH103L	GENERAL CHEMISTRY LABORATORY	1	SPRING ONLY/ ALL YEARS

### Choice of (3 credit hours):

Course	Course Title	Credits	Term Offered
BI392	LABORATORY TEACHING AND ASSISTING	1 - 3	FALL/SPRING/ ALL YEARS

Or:

BI-390 Special Project

BI-398 Internship

BI-498 Internship

**Choice of (4 credit hours):**

Course	Course Title	Credits	Term Offered
BI302	PLANT BIOLOGY	3	FALL ONLY/ EVEN YEARS
BI302L	PLANT BIOLOGY LABORATORY	1	FALL ONLY/ EVEN YEARS
BI365	PLANT SYSTEMATICS	3	SPRING ONLY/ EVEN YEARS
BI365L	PLANT SYSTEMATICS LABORATORY	1	SPRING ONLY/ EVEN YEARS

**Choice of (4 credit hours):**

Course	Course Title	Credits	Term Offered
BI303	INVERTEBRATE ZOOLOGY	3	SPRING ONLY/ ODD YEARS
BI303L	INVERTEBRATE ZOOLOGY LABORATORY	1	SPRING ONLY/ ODD YEARS
BI333	COMPARATIVE VERTEBRATE ANATOMY	3	FALL ONLY/ ODD YEARS
BI333L	COMPARATIVE VERTEBRATE ANATOMY LABORATORY	1	FALL ONLY/ ODD YEARS
BI475	ADVANCE ANIMAL PHYSIOLOGY	3	SPRING ONLY/ ALL YEARS
BI475L	ADVANCED ANIMAL PHYSIOLOGY LABORATORY	1	SPRING ONLY/ ALL YEARS

**Choice of (5-6 credit hours):**

Course	Course Title	Credits	Term Offered
MA161A	COLLEGE ALGEBRA AND TRIGONOMETRY	3	FALL/SPRING/ ALL YEARS
MA161B	COLLEGE ALGEBRA AND TRIGONOMETRY	3	FALL/SPRING/ ALL YEARS
MA165	PRECALCULUS	5	FALL/SPRING/ ALL YEARS

BI-100/L, BI-157/L, BI-158/L, and CH-102/L may also fulfill [General Education requirements](#).

BI-410/L may not be double counted as required, elective, or capstone courses.

**STEM Upper-Division Electives (16 credit hours)**

Course	Course Title	Credits	Term Offered
BI302	PLANT BIOLOGY	3	FALL ONLY/ EVEN YEARS
BI302L	PLANT BIOLOGY LABORATORY	1	FALL ONLY/ EVEN YEARS
BI323	PLANT PATHOLOGY	3	FALL ONLY/ EVEN YEARS
BI323L	PLANT PATHOLOGY LAB	1	FALL ONLY/ EVEN YEARS
BI333	COMPARATIVE VERTEBRATE ANATOMY	3	FALL ONLY/ ODD YEARS
BI333L	COMPARATIVE VERTEBRATE ANATOMY LABORATORY	1	FALL ONLY/ ODD YEARS
BI350	ETHOLOGY	3	SPRING ONLY/ ALL YEARS
BI350L	ETHOLOGY LABORATORY	1	SPRING ONLY/ ALL YEARS
BI380	OCEANOGRAPHY	3	FALL ONLY/ ALL YEARS
BI380L	OCEANOGRAPHY LABORATORY	1	FALL ONLY/ ALL YEARS
BI430	SCIENTIFIC PHOTOGRAPHY	3	SPRING ONLY/ EVEN YEARS
BI430L	SCIENTIFIC PHOTOGRAPHY LABORATORY	1	
BI416	CELLULAR & MOLECULAR BIOLOGY	3	SPRING ONLY/ ALL YEARS
BI416L	CELLULAR & MOLECULAR BIOLOGY LABORATORY	1	SPRING ONLY/ ALL YEARS

Course	Course Title	Credits	Term Offered
BI302	PLANT BIOLOGY	3	FALL ONLY/ EVEN YEARS
BI425	MOLECULAR MEDICINE	3	SPRING ONLY/ ODD YEARS
BI425L	MOLECULAR MEDICINE LABORATORY	2	SPRING ONLY/ ODD YEARS
BI432	PHARMACOLOGY	3	FALL ONLY/ ODD YEARS
BI474	MARINE BOTANY	4	SPRING ONLY/ ODD YEARS
BI475	ADVANCE ANIMAL PHYSIOLOGY	3	SPRING ONLY/ ALL YEARS
BI475L	ADVANCED ANIMAL PHYSIOLOGY LABORATORY	1	SPRING ONLY/ ALL YEARS
BI365	PLANT SYSTEMATICS	3	SPRING ONLY/ EVEN YEARS
BI365L	PLANT SYSTEMATICS LABORATORY	1	SPRING ONLY/ EVEN YEARS
BI303	INVERTEBRATE ZOOLOGY	3	SPRING ONLY/ ODD YEARS
BI303L	INVERTEBRATE ZOOLOGY LABORATORY	1	SPRING ONLY/ ODD YEARS
BI345	GENERAL ENTOMOLOGY	3	FALL ONLY/ ODD YEARS
BI345L	GENERAL ENTOMOLOGY LABORATORY	1	FALL ONLY/ ODD YEARS
BI410	ECOLOGY	3	SPRING ONLY/ ALL YEARS
BI410L	ECOLOGY LABORATORY	2	SPRING ONLY/ ALL YEARS

Course	Course Title	Credits	Term Offered
BI425	MOLECULAR MEDICINE	3	SPRING ONLY/ ODD YEARS
BI425L	MOLECULAR MEDICINE LABORATORY	2	SPRING ONLY/ ODD YEARS
BI432	PHARMACOLOGY	3	FALL ONLY/ ODD YEARS
BI474	MARINE BOTANY	4	SPRING ONLY/ ODD YEARS
CH310A	ORGANIC CHEMISTRY	3	FALL ONLY/ ALL YEARS
CH311	BASIC LABORATORY TECHNIQUES IN ORGANIC CHEMISTRY	2	FALL ONLY/ ALL YEARS
CH310B	ORGANIC CHEMISTRY	3	SPRING ONLY/ ALL YEARS
CH312	LABORATORY TECHNIQUES IN ORGANIC CHEMISTRY	2	SPRING ONLY/ ALL YEARS
CH330	QUANTITATIVE ANALYSIS	3	FALL ONLY/ ODD YEARS
CH330L	QUANTITATIVE ANALYSIS LABORATORY	2	FALL ONLY/ ODD YEARS
CH350	FOUNDATIONS OF PHYSICAL CHEMISTRY	3	FALL ONLY/ ALL YEARS
CH350L	FOUNDATIONS OF PHYSICAL CHEMISTRY LABORATORY	1	FALL ONLY/ ALL YEARS
CH419	BIOCHEMISTRY	3	SPRING ONLY/ ALL YEARS
CH419L	BIOCHEMISTRY LABORATORY	1	SPRING ONLY/ ALL YEARS

Note: Other STEM courses are possible if approved by student's advisor and program chair. Cannot double count courses taken to satisfy Core or Capstone requirements. Students must meet all course prerequisites prior to enrollment.

### **Career-Building Electives (12 credit hours)**

Course	Course Title	Credits	Term Offered
BI225	BASIC MICROBIOLOGY	3	FALL ONLY/ ALL YEARS
BI225L	BASIC MICROBIOLOGY LABORATORY	1	FALL ONLY/ ALL YEARS
MA203	CALCULUS I	5	FALL/SPRING/ ALL YEARS
MA204	CALCULUS II	5	FALL/SPRING/ ALL YEARS
MA205	MULTIVARIABLE CALCULUS	4	FALL/SPRING/ ALL YEARS
MA301	DIFFERENTIAL EQUATIONS	3	SPRING ONLY/ ALL YEARS
PH251	UNIVERSITY PHYSICS	4	FALL ONLY/ ALL YEARS
PH252	UNIVERSITY PHYSICS	4	SPRING ONLY/ ALL YEARS
HS200	HEALTH AND WELLNESS	3	FALL/SPRING/ ALL YEARS
HS216	INTRODUCTION TO PUBLIC HEALTH	3	FALL ONLY/ ALL YEARS
HS405	EPIDEMIOLOGY	3	FALL/SPRING/ ALL YEARS
AL281	PRINCIPLES OF HORTICULTURAL SCIENCE	3	SPRING ONLY/ ALL YEARS
AL281L	PRINCIPLES OF HORTICULTURAL SCIENCE LAB	1	SPRING ONLY/ ALL YEARS
AL300	FOOD PROCESSING TECHNOLOGY	3	FALL ONLY/ ODD YEARS
AL300L	FOOD PROCESSING TECHNOLOGY LAB	1	FALL ONLY/ ODD YEARS

Course	Course Title	Credits	Term Offered
AL443	TECHNOLOGIES FOR SUSTAINABLE TROPICAL AGRICULTURE	3	SPRING ONLY/ ODD YEARS
AL443L	TECHONOLOGIES FOR SUSTAINABLE TROPICAL AGRICULTURE LABORATORY	1	SPRING ONLY/ ODD YEARS
AL445	FOOD CHEMISTRY	3	SPRING ONLY/ EVEN YEARS
AL445L	FOOD CHEMISTRY LABORATORY	1	SPRING ONLY/ EVEN YEARS
AL484	TROPICAL VEGETABLE PRODUCTION	3	SPRING ONLY/ ODD YEARS
AL484L	TROPICAL VEGETABLE PRODUCTION LAB	1	SPRING ONLY/ ODD YEARS
AL485	TROPICAL FRUITS HORTICULTURE	3	SPRING ONLY/ EVEN YEARS
AL485L	TROPICAL FRUITS HORTICULTURE LABORATORY	1	SPRING ONLY/ EVEN YEARS
AL486	ORNAMENTAL CROP PRODUCTION IN THE TROPICS	3	FALL ONLY/ EVEN YEARS
AL486L	ORNAMENTAL CROP PRODUCTION IN THE PACIFIC LABORATORY	1	FALL ONLY/ EVEN YEARS



Course	Course Title	Credits	Term Offered
AL389	EXTENSION PROGRAMS & PLANNING	3	SPRING ONLY/ ALL YEARS
AL401	COMMUNITY PLANNING	3	AS REQUIRED
BA110	PRINCIPLES OF ECONOMICS	3	FALL/SPRING/ ALL YEARS
BA200	PRINCIPLES OF FINANCIAL ACCOUNTING	3	FALL/SPRING/ ALL YEARS
BA240	MANAGEMENT OF ORGANIZATIONS	3	FALL/SPRING/ ALL YEARS
BA241	HUMAN RESOURCE MANAGEMENT	3	FALL/SPRING/ ALL YEARS
CO226	MEDIA WRITING	3	FALL ONLY/ ALL YEARS
CO350	PUBLIC SPEAKING	3	SPRING ONLY/ ALL YEARS
CO370	ORGANIZATIONAL COMMUNICATION	3	SPRING ONLY/ ODD YEARS
LW360	ADMINISTRATIVE PROCEDURE	3	FALL/SPRING/ ALL YEARS
PA201	PUBLIC ADMINISTRATION IN GUAM AND IN THE WESTERN PACIFIC	3	FALL/SPRING/ ALL YEARS
PA210	PUBLIC ADMINISTRATION AND MANAGEMENT: CONCEPTS AND APPLICATIONS	3	FALL/SPRING/ ALL YEARS
PA215	SUPERVISION IN	3	FALL/SPRING/ ALL YEARS

Course	Course Title	Credits	Term Offered
	GOVERNMENT ORGANIZATIONS		
PA303	GOVERNMENT FINANCE	3	FALL/SPRING/ ALL YEARS
PA304	GOVERNMENT PUBLIC INFORMATION	3	FALL/SPRING/ ALL YEARS
ED110	INTRODUCTION TO TEACHING	3	FALL/SPRING/ ALL YEARS
ED271	TECHNOLOGY APPLICATIONS FOR EDUCATORS	3	FALL/SPRING/ ALL YEARS

Note: Other Career-Building courses are possible if approved by student's advisor and program chair. Cannot double count courses taken to satisfy Core or Capstone requirements. Students must meet all course prerequisites prior to enrollment.

### Capstone Course (4-5 credit hours)

Course	Course Title	Credits	Term Offered
BI410	ECOLOGY	3	SPRING ONLY/ ALL YEARS
BI410L	ECOLOGY LABORATORY	2	SPRING ONLY/ ALL YEARS
BI475	ADVANCE ANIMAL PHYSIOLOGY	3	SPRING ONLY/ ALL YEARS
BI475L	ADVANCED ANIMAL PHYSIOLOGY LABORATORY	1	SPRING ONLY/ ALL YEARS

Cannot double count as Applied Biology Core Courses or STEM/Career Building Electives.

## MINOR REQUIREMENTS

### BIOLOGY MINOR REQUIREMENTS (33-35 CREDIT HOURS)

#### Required Courses (25-27 credit hours)

Course	Course Title	Credits	Term Offered
BI100	ENVIRONMENTAL BIOLOGY	3	FALL/SPRING/ ALL YEARS
BI100L	ENVIRONMENTAL BIOLOGY LABORATORY	1	FALL/SPRING/ ALL YEARS
BI157	PRINCIPLES OF BIOLOGY I	3	SPRING ONLY/ ALL YEARS
BI157L	PRINCIPLES OF BIOLOGY I LABORATORY	1	SPRING ONLY/ ALL YEARS
BI158	PRINCIPLES OF BIOLOGY II	3	FALL ONLY/ ALL YEARS
BI158L	PRINCIPLES OF BIOLOGY II LABORATORY	1	FALL ONLY/ ALL YEARS
BI310	EVOLUTION	3	SPRING ONLY/ ALL YEARS
BI315	GENERAL GENETICS	3	FALL ONLY/ ALL YEARS
BI315L	GENERAL GENETICS LABORATORY	1	FALL ONLY/ ALL YEARS
MA115	INTRODUCTORY COLLEGE ALGEBRA	3	FALL/SPRING/ ALL YEARS

#### Choice of (3-5 credit hours):

Course	Course Title	Credits	Term Offered
MA161A	COLLEGE ALGEBRA AND TRIGONOMETRY	3	FALL/SPRING/ ALL YEARS
MA165	PRECALCULUS	5	FALL/SPRING/ ALL YEARS

#### Elective Courses (8 credit hours)

Must meet respective prerequisites to enroll.

Course	Course Title	Credits	Term Offered
BI225	BASIC MICROBIOLOGY	3	FALL ONLY/ ALL YEARS
BI225L	BASIC MICROBIOLOGY LABORATORY	1	FALL ONLY/ ALL YEARS
BI302	PLANT BIOLOGY	3	FALL ONLY/ EVEN YEARS
BI302L	PLANT BIOLOGY LABORATORY	1	FALL ONLY/ EVEN YEARS
BI303	INVERTEBRATE ZOOLOGY	3	SPRING ONLY/ ODD YEARS
BI303L	INVERTEBRATE ZOOLOGY LABORATORY	1	SPRING ONLY/ ODD YEARS
BI320	SCIENTIFIC REPORT WRITING	2	SPRING ONLY/ ALL YEARS
BI321	SCIENTIFIC ARGUMENTS	2	SPRING ONLY/ ALL YEARS
BI323	PLANT PATHOLOGY	3	FALL ONLY/ EVEN YEARS
BI323L	PLANT PATHOLOGY LAB	1	FALL ONLY/ EVEN YEARS
BI333	COMPARATIVE VERTEBRATE ANATOMY	3	FALL ONLY/ ODD YEARS
BI333L	COMPARATIVE VERTEBRATE ANATOMY LABORATORY	1	FALL ONLY/ ODD YEARS
BI345	GENERAL ENTOMOLOGY	3	FALL ONLY/ ODD YEARS
BI345L	GENERAL ENTOMOLOGY LABORATORY	1	FALL ONLY/ ODD YEARS

Course	Course Title	Credits	Term Offered
BI350	ETHOLOGY	3	SPRING ONLY/ ALL YEARS
BI350L	ETHOLOGY LABORATORY	1	SPRING ONLY/ ALL YEARS
BI365	PLANT SYSTEMATICS	3	SPRING ONLY/ EVEN YEARS
BI365L	PLANT SYSTEMATICS LABORATORY	1	SPRING ONLY/ EVEN YEARS
BI380	OCEANOGRAPHY	3	FALL ONLY/ ALL YEARS
BI380L	OCEANOGRAPHY LABORATORY	1	FALL ONLY/ ALL YEARS
BI392	LABORATORY TEACHING AND ASSISTING	1 - 3	FALL/SPRING/ ALL YEARS
BI410	ECOLOGY	3	SPRING ONLY/ ALL YEARS
BI410L	ECOLOGY LABORATORY	2	SPRING ONLY/ ALL YEARS
BI412	BIOMETRICS	3	FALL ONLY/ ALL YEARS
BI412L	BIOMETRICS LABORATORY	1	FALL ONLY/ ALL YEARS
BI416	CELLULAR & MOLECULAR BIOLOGY	3	SPRING ONLY/ ALL YEARS
BI416L	CELLULAR & MOLECULAR BIOLOGY LABORATORY	1	SPRING ONLY/ ALL YEARS
BI419	BIOCHEMISTRY	3	SPRING ONLY/ ALL YEARS
BI419L	BIOCHEMISTRY LABORATORY	1	SPRING ONLY/ ALL YEARS

Course	Course Title	Credits	Term Offered
BI425	MOLECULAR MEDICINE	3	SPRING ONLY/ ODD YEARS
BI425L	MOLECULAR MEDICINE LABORATORY	2	SPRING ONLY/ ODD YEARS
BI430	SCIENTIFIC PHOTOGRAPHY	3	SPRING ONLY/ EVEN YEARS
BI430L	SCIENTIFIC PHOTOGRAPHY LABORATORY	1	
BI432	PHARMACOLOGY	3	FALL ONLY/ ODD YEARS
BI474	MARINE BOTANY	4	SPRING ONLY/ ODD YEARS
BI475	ADVANCE ANIMAL PHYSIOLOGY	3	SPRING ONLY/ ALL YEARS
BI475L	ADVANCED ANIMAL PHYSIOLOGY LABORATORY	1	SPRING ONLY/ ALL YEARS

Or:

BI-390 Special Project

BI-398 Internship

BI-498 Internship

## FACULTY

### Laura A.F. Biggs

Associate Professor of Biology  
College of Natural & Applied Sciences  
(671) 735-2783  
[lbiggs@triton.uog.edu](mailto:lbiggs@triton.uog.edu)

### Frank A. Camacho

Associate Professor of Biology  
College of Natural & Applied Sciences  
(671) 735-2835

[fcamacho@triton.uog.edu](mailto:fcamacho@triton.uog.edu)

### G. Curt Fiedler

Professor of Biology  
College of Natural & Applied Sciences  
(671) 734-2788  
[gcfiedler@triton.uog.edu](mailto:gcfiedler@triton.uog.edu)

### Subir Ghosh

Professor of Biology  
College of Natural & Applied Sciences  
(671) 735-2788  
[sghosh@triton.uog.edu](mailto:sghosh@triton.uog.edu)

### Daniel P. Lindstrom

Associate Professor of Biology  
College of Natural & Applied Sciences  
(671) 735-2611  
[dlindstrom@triton.uog.edu](mailto:dlindstrom@triton.uog.edu)

### Katharine L. Lofdahl

Associate Professor of Biology  
College of Natural & Applied Sciences  
(671) 735-2786  
[klofdahl@triton.uog.edu](mailto:klofdahl@triton.uog.edu)

### Michael Orr

Assistant Professor of Biology  
College of Natural & Applied Sciences  
(671) 735-2782  
[orm@triton.uog.edu](mailto:orm@triton.uog.edu)

### Timothy L. Righetti

Professor of Biology  
College of Natural & Applied Sciences  
(671) 735-2797  
[trighetti@triton.uog.edu](mailto:trighetti@triton.uog.edu)

### Wei Xiao

Assistant Professor of Biology  
College of Natural & Applied Sciences  
(671) 735-2791  
[xiaow@triton.uog.edu](mailto:xiaow@triton.uog.edu)