



## **ACADEMIC CATALOG**

### **BIOTECHNOLOGY ENGINEERING**

#### **DEGREE PROFILE**

The Biotechnological Engineer of Universidad de Las Américas is a competent, enterprising professional with a global international vision, capable of developing basic and applied research, who designs and executes biotechnological processes, performs laboratory analysis and manages projects, using technologies based on Modern Biology.

The Biotechnological Engineer is expected to play different roles in multidisciplinary work teams, both in national and international contexts. Their training is framed in the values and ethical principles of honesty and scientific rigor, as well as in the development of a social and environmental commitment, respectful of legislation.

#### **LEARNING OUTCOMES**

- 1.- An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
- 2.- An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
- 3.- An ability to communicate effectively with a range of audiences within the field.
- 4.- An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
- 5.- An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
- 6.- An ability to develop and conduct appropriate experimentation, analyze, and interpret data, and use engineering judgment to draw conclusions.
- 7.- An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.



## **FIRST SEMESTER**

- 1.- MATZ0339 INTRODUCTION TO CALCULUS**
- 2.- IBIO1404 GENERAL CHEMISTRY**
- 3.- IBIO1406 INTRODUCTION TO BIOTECHNOLOGY**
- 4.- FISZ0121 GENERAL PHYSICS**
- 5.- FGLZ0192 LANGUAGE AND DIGITAL COMMUNICATION**

## **SECOND SEMESTER**

- 1.- MATZ0341 CALCULUS I**

**Prerequisites :**

MATZ0339 INTRODUCTION TO CALCULUS

- 2.- IBIO1410 ORGANIC CHEMISTRY**

**Prerequisites :**

IBIO1404 GENERAL CHEMISTRY

- 3.- IBIO1415 APPLIED CHEMISTRY**

**Prerequisites :**

IBIO1404 GENERAL CHEMISTRY

- 4.- IBIO1413 CELLULAR BIOLOGY**

**Prerequisites :**

IBIO1406 INTRODUCTION TO BIOTECHNOLOGY

- 5.- FGLZ0180 RESEARCH AND ACADEMIC WRITING**

**Prerequisites :**

FGLZ0192 LANGUAGE AND DIGITAL COMMUNICATION

## **THIRD SEMESTER**

- 1.- MATZ0342 CALCULUS II**

**Prerequisites :**

MATZ0341 CALCULUS I

- 2.- IBIO1420 ANALYTICAL CHEMISTRY**

**Prerequisites :**

IBIO1415 APPLIED CHEMISTRY



### **3.- IBIO2303 PHYSICS FOR BIOTECHNOLOGY**

**Prerequisites :**

FISZ0121 GENERAL PHYSICS

MATZ0341 CALCULUS I

### **4.- IBIO2409 ANIMAL BIOLOGY**

**Prerequisites :**

IBIO1413 CELLULAR BIOLOGY

### **5.- FGHZ0932 CITIZENSHIP, CULTURE AND HISTORY**

### **6.- IBIO1603 RESEARCH METHODOLOGY**

**Prerequisites :**

FGLZ0180 RESEARCH AND ACADEMIC WRITING

## **FOURTH SEMESTER**

### **1.- MATZ0346 DIFFERENTIAL EQUATIONS**

**Prerequisites :**

MATZ0342 CALCULUS II

### **2.- IBIO2421 BIOCHEMISTRY I**

**Prerequisites :**

IBIO1415 APPLIED CHEMISTRY

IBIO1413 CELLULAR BIOLOGY

### **3.- IBIO2403 GENETICS**

**Prerequisites :**

IBIO1413 CELLULAR BIOLOGY

IBIO1603 RESEARCH METHODOLOGY

### **4.- IBIO2427 PLANT BIOLOGY**

**Prerequisites :**

IBIO1413 CELLULAR BIOLOGY

### **5.- IBIO1419 BIostatistics I**

**Prerequisites :**

MATZ0339 INTRODUCTION TO CALCULUS

IBIO1603 RESEARCH METHODOLOGY



## **FIFTH SEMESTER**

### **1.- IBIO2415 PHYSICAL CHEMISTRY**

#### **Prerequisites :**

IBIO2303 PHYSICS FOR BIOTECHNOLOGY

IBIO1420 ANALYTICAL CHEMISTRY

MATZ0346 DIFFERENTIAL EQUATIONS

### **2.- IBIO2412 BIOCHEMISTRY II**

#### **Prerequisites :**

IBIO2421 BIOCHEMISTRY I

MATZ0346 DIFFERENTIAL EQUATIONS

### **3.- IBIO2406 MOLECULAR BIOLOGY I**

#### **Prerequisites :**

IBIO2403 GENETICS

IBIO2421 BIOCHEMISTRY I

### **4.- IBIO2418 MICROBIOLOGY I**

#### **Prerequisites :**

IBIO2409 ANIMAL BIOLOGY

IBIO2427 PLANT BIOLOGY

### **5.- IBIO2422 BIostatISTICS II**

#### **Prerequisites :**

IBIO1419 BIostatISTICS I

## **SIXTH SEMESTER**

### **1.- IBIO2306 BALANCE OF MASS AND ENERGY**

#### **Prerequisites :**

MATZ0346 DIFFERENTIAL EQUATIONS

IBIO2303 PHYSICS FOR BIOTECHNOLOGY

IBIO2421 BIOCHEMISTRY I

### **2.- IBIO2424 BIOCHEMISTRY III**

#### **Prerequisites :**

IBIO2412 BIOCHEMISTRY II

IBIO2406 MOLECULAR BIOLOGY I



### **3.- IBIO2430 IMMUNOLOGY**

**Prerequisites :**

IBIO2421 BIOCHEMISTRY I

IBIO2406 MOLECULAR BIOLOGY I

### **4.- IBIO2433 MICROBIOLOGY II**

**Prerequisites :**

IBIO2418 MICROBIOLOGY I

**Corequisites :**

IBIO1610 INTEGRATIVE RESEARCH PROJECT

### **5.- IBIO2436 MOLECULAR BIOLOGY II**

**Prerequisites :**

IBIO2406 MOLECULAR BIOLOGY I

### **6.- IBIO1610 INTEGRATIVE RESEARCH PROJECT**

**Prerequisites :**

IBIO2418 MICROBIOLOGY I

**Corequisites :**

IBIO2433 MICROBIOLOGY II

## **SEVENTH SEMESTER**

### **1.- IBIO2321 BIOTECHNOLOGICAL UNIT OPERATIONS**

**Prerequisites :**

IBIO2306 BALANCE OF MASS AND ENERGY

IBIO2415 PHYSICAL CHEMISTRY

### **2.- IBIO2309 BIOINFORMATICS**

**Prerequisites :**

IBIO2406 MOLECULAR BIOLOGY I

IBIO2421 BIOCHEMISTRY I

### **3.- IBIO3204 MOLECULAR BIOLOGY III**

**Prerequisites :**

IBIO2436 MOLECULAR BIOLOGY II

IBIO2433 MICROBIOLOGY II

### **4.- IBIO3524 ENVIRONMENTAL BIOTECHNOLOGY**



**Prerequisites :**

IBIO2433 MICROBIOLOGY II

IBIO2436 MOLECULAR BIOLOGY II

**5.- FGHZ0913 ECONOMY, ETHOS AND SOCIETY**

**EIGHTH SEMESTER**

**1.- IBIO3510 BIOPROCESS**

**Prerequisites :**

IBIO2321 BIOTECHNOLOGICAL UNIT OPERATIONS

IBIO2433 MICROBIOLOGY II

IBIO2424 BIOCHEMISTRY III

**2.- IBIO3519 PLANT BIOTECHNOLOGY**

**Prerequisites :**

IBIO3204 MOLECULAR BIOLOGY III

IBIO2424 BIOCHEMISTRY III

**3.- IBIO3521 ANIMAL BIOTECHNOLOGY**

**Prerequisites :**

IBIO3204 MOLECULAR BIOLOGY III

IBIO2309 BIOINFORMATICS

**4.- IBIO1401 BIOMEDICAL BIOTECHNOLOGY**

**Prerequisites :**

IBIO2309 BIOINFORMATICS

IBIO3204 MOLECULAR BIOLOGY III

**5.- TITA7441 PROJECT MANAGEMENT IN BIOTECHNOLOGY**

**Prerequisites :**

IBIO1610 INTEGRATIVE RESEARCH PROJECT

FGHZ0913 ECONOMY, ETHOS AND SOCIETY

**NINTH SEMESTER**

**1.- IBIO1402 BIOTECHNOLOGY AND ENTREPRENEURSHIP**

**Prerequisites :**

IBIO1610 INTEGRATIVE RESEARCH PROJECT



FGHZ0913 ECONOMY, ETHOS AND SOCIETY

**2.- IBIO3706 PRE-PROFESSIONAL INTERNSHIP**

**Prerequisites :**

IBIO2433 MICROBIOLOGY II

IBIO2436 MOLECULAR BIOLOGY II

**3.- IBIO3512 INDUSTRIAL BIOTECHNOLOGY**

**Prerequisites :**

IBIO3510 BIOPROCESS

**4.- IBIO1407 QUALITY AND BIOSAFETY**

**Prerequisites :**

IBIO1610 INTEGRATIVE RESEARCH PROJECT

**5.- TITA7442 BIOTECHNOLOGY PROJECT**

**Prerequisites :**

IBIO1401 BIOMEDICAL BIOTECHNOLOGY

IBIO3519 PLANT BIOTECHNOLOGY

IBIO3524 ENVIRONMENTAL BIOTECHNOLOGY

IBIO3510 BIOPROCESS

IBIO3521 ANIMAL BIOTECHNOLOGY

TITA7441 PROJECT MANAGEMENT IN BIOTECHNOLOGY