



Ministry of Education
Federal University of Latin American Integration
Dean's Office for Undergraduate Studies



CURRICULUM – BIOTECHNOLOGY – BACHELOR'S DEGREE

COURSE COMPONENT	PREREQUISITE (P) / COREQUISITE (C)	CREDITS	CREDIT HOURS				
			THEORETICAL	PRACTICE	MANDATORY INTERNSHIP	COMMUNITY OUTREACH	TOTAL HOURS
SEMESTER 1							
FUNDAMENTALS OF LATIN AMERICA I	None	4	60	0	0	0	60
ADDITIONAL BASIC PORTUGUESE / SPANISH	None	6	90	0	0	0	90
GENERAL CHEMISTRY	None	4	60	0	0	0	60
EXPERIMENTAL GENERAL CHEMISTRY	(c) General Chemistry	2	0	30	0	0	30
CALCULUS A	None	4	60	0	0	0	60
INTRODUCTION TO BIOTECHNOLOGY	None	1	15	0	0	0	15
CELL BIOLOGY	(c) Experimental Cell Biology	4	60	0	0	0	60
EXPERIMENTAL CELL BIOLOGY	(c) Cell Biology	2	0	30	0	0	30
TOTAL NUMBERS IN THE SEMESTER		27	345	60	0	0	405
SEMESTER 2							
FUNDAMENTALS OF LATIN AMERICA II	None	4	60	0	0	0	60
INTRODUCTION TO SCIENTIFIC THINKING	None	4	60	0	0	0	60
ADDITIONAL INTERMEDIATE PORTUGUESE / SPANISH I	(p) Additional Basic Portuguese / Spanish	6	90	0	0	0	90
PHYSICS FOR BIOTECHNOLOGY	(p) Calculus A; (c) Experimental Physics for Biotechnology	4	60	0	0	0	60
EXPERIMENTAL PHYSICS FOR BIOTECHNOLOGY	(p) Calculus A; (c) Physics for Biotechnology	2	0	30	0	0	30
GENERAL GENETICS	(p) Cell Biology; (c) Exeperimental General Genetics	4	60	0	0	0	60
EXPERIMENTAL GENERAL GENETICS	(p) Cell Biology; (c) General Genetics	2	0	30	0	0	30
ANIMAL MORPHOLOGY	(p) Cell Biology	3	30	15	0	0	45
TOTAL NUMBERS IN THE SEMESTER		29	360	75	0	0	435
SEMESTER 3							
FUNDAMENTALS OF LATIN AMERICA III	(p) Fundamentals of Latin America I and II	2	30	0	0	0	30
ETHICS AND SCIENCE	None	4	60	0	0	0	60
BIOPHYSICS	(p) Cell Biology; (p) Physics for Biotechnology	4	30	30	0	0	60
BIODIVERSITY AND GENETICS OF MICROORGANISMS	(p) Cell Biology	5	30	45	0	15	75
ANIMAL AND PLANT BIODIVERSITY	None	6	60	30	0	0	90
ENGLISH FOR ACADEMIC PURPOSES	None	4	60	0	0	0	60
ORGANIC CHEMISTRY	(p) General Chemistry; (c) Experimental Organic Chemistry	2	30	0	0	0	30
EXPERIMENTAL ORGANIC CHEMISTRY	(p) General Chemistry; (p) Experimental General Chemistry; (c) Organic Chemistry	2	0	30	0	0	30
TOTAL NUMBERS IN THE SEMESTER		29	300	135	0	15	435
SEMESTER 4							
GENERAL ECOLOGY	None	2	30	0	0	0	30
MOLECULAR BIOLOGY	(p) General Genetics	4	45	15	0	0	60
BIOETHICS AND BIOSAFETY	(p) Ethics and Science	2	30	0	0	0	30
ANIMAL PHYSIOLOGY	(P) Animal Morphology	4	30	30	0	0	60

GENERAL AND APPLIED ENTOMOLOGY	(p) Animal and Plant Biodiversity	3	30	15	0	0	45
ADMINISTRATION, ENTREPRENEURSHIP AND INTELLECTUAL PROPERTY	(p) Introduction to Biotechnology; (c) Bioethics and Biosafety	4	60	0	0	15	60
BIOCHEMISTRY I	(p) Organic Chemistry	4	30	30	0	0	60
ANALYTICAL CHEMISTRY	(p) General Chemistry; (c) Experimental Analytical Chemistry	2	30	0	0	0	30
EXPERIMENTAL ANALYTICAL CHEMISTRY	(p) General Chemistry; (p) Experimental General Chemistry; (c) Analytical Chemistry	2	0	30	0	0	30
BIOTECHNOLOGY FOR THE COMMUNITY	(p) Genética Geral	5	0	75	0	75	75
TOTAL NUMBERS IN THE SEMESTER		32	285	195	0	90	480
SEMESTER 5							
PLANT ANATOMY AND PHYSIOLOGY	(p) Animal and Plant Biodiversity; (c) Experimental Plant Anatomy and Physiology	3	45	0	0	0	45
EXPERIMENTAL PLANT ANATOMY AND PHYSIOLOGY	(p) Animal and Plant Biodiversity; (c) Plant Anatomy and Physiology	2	0	30	0	0	30
CELL AND TISSUE ENGINEERING	(p) Animal Physiology; (c) General Immunology and Immunology Applied to Biotechnology; (c) Experimental Cell and Tissue Engineering	2	30	0	0	0	30
EXPERIMENTAL CELL AND TISSUE ENGINEERING	(p) Animal Physiology; (c) General Immunology and Immunology Applied to Biotechnology; (c) Cell and Tissue Engineering	2	0	30	0	0	30
GENETIC ENGINEERING AND GENE THERAPY	(p) Molecular Biology; (c) Experimental Genetic Engineering and Gene Therapy	2	30	0	0	0	30
EXPERIMENTAL GENETIC ENGINEERING AND GENE THERAPY	(p) Molecular Biology; (c) Genetic Engineering and Gene Therapy	2	0	30	0	0	30
GENERAL PARASITOLOGY	(p) Animal and Plant Biodiversity	4	45	15	0	0	60
BIOCHEMISTRY II	(p) Biochemistry I	2	15	15	0	0	30
GENERAL IMMUNOLOGY AND IMMUNOLOGY APPLIED TO BIOTECHNOLOGY	(p) Biodiversity and Genetics of Microorganisms; (c) Cell and Tissue Engineering	4	30	30	0	0	60
BIOTECHNOLOGY IN PEST CONTROL	(p) General and Applied Entomology	4	30	30	0	15	60
TOTAL NUMBERS IN THE SEMESTER		27	225	180	0	15	405
SEMESTER 6							
COMPUTER PROGRAMMING	(c) Biostatistics; (p) Genetic Engineering and Gene Therapy	4	30	30	0	0	60
BIOTECHNOLOGY AND PLANT ENHANCEMENT	(p) Plant Anatomy and Physiology; (p) Molecular Biology; (c) Biostatistics	3	30	15	0	0	45
BIostatISTICS	(p) Calculus A	4	60	0	0	0	60
FERMENTATION PROCESSES AND ENZYMOLOGY	(p) Biochemistry II; (p) Biodiversity and Genetics of Microorganisms; (c) Principles of Bioprocesses and Bioreactors	5	45	30	0	0	75
BIOINORGANIC CHEMISTRY	(p) Biochemistry I	2	30	0	0	0	30
PRINCIPLES OF BIOPROCESSES AND BIOREACTORS	(p) Biochemistry II; (p) Biodiversity and Genetics of Microorganisms; (c) Fermentation Processes and Enzymology	5	45	30	0	0	75
ELECTIVE		4	60	0	0	0	60
TOTAL NUMBERS IN THE SEMESTER		27	300	105	0	0	405
SEMESTER 7							
DEVELOPMENTAL EMBRYOLOGY AND BIOLOGY FOR BIOTECHNOLOGY	(p) Molecular Biology; (p) Animal Physiology	4	45	15	0	0	60
PRINCIPLES OF PHARMACOLOGY AND PHARMACOTECHNICS	(p) Animal Physiology; (p) General Immunology and Immunology Applied to Biotechnology	3	30	15	0	0	45
INDUSTRIAL MICROBIOLOGY	(p) Principles of Bioprocesses and Bioreactors; (p) Fermentation Processes and Enzymology	2	15	15	0	0	30
GENERAL TOXICOLOGY	(p) Biochemistry II; (p) General Ecology	4	45	15	0	0	60
ENVIRONMENTAL BIOTECHNOLOGY	(p) Biodiversity and Genetics of Microorganisms	5	45	30	0	0	75
ELECTIVE	None	4	60	0	0	0	60
TOTAL NUMBERS IN THE SEMESTER		22	240	90	0	0	330
SEMESTER 8							
OMICS SCIENCES AND BIOINFORMATICS	(p) Computer Programming; (p) Genetic Engineering and Gene Therapy	4	30	30	0	0	60
BIOMATERIALS AND BIOSENSORS	(p) Biochemistry II	4	45	15	0	0	60
PRINCIPLES OF BIOFUELS	(p) Organic Chemistry; (p) Fermentation Processes and Enzymology	2	15	15	0	0	30
VACCINE DEVELOPMENT TECHNOLOGY	(p) General Immunology and Immunology Applied to Biotechnology; (p) Cell and Tissue Engineering	3	30	15	0	0	45

FINAL PAPER I	See Syllabus (Item 11.2)	4	60	0	0	0	60
ELECTIVE	None	4	60	0	0	0	60
TOTAL NUMBERS IN THE SEMESTER		21	240	75	0	0	315
SEMESTER 9							
PHARMACEUTICAL BIOTECHNOLOGY	(p) Principles of Pharmacology and Pharmacotechnics	3	15	30	0	15	45
BIOTECHNOLOGY AND ANIMAL ENHANCEMENT	(p) Genetic Engineering and Gene Therapy; (p) Animal Physiology; (p) Biostatistics	4	45	15	0	0	60
MEDICAL BIOTECHNOLOGY	(p) Molecular Biology; (p) Animal Physiology; (p) Biodiversity and Genetics of Microorganisms	3	15	30	0	15	45
FINAL PAPER II	(p) Final Paper I	4	60	0	0	0	60
ELECTIVE		4	60	0	0	0	60
TOTAL NUMBERS IN THE SEMESTER		18	195	75	0	30	270
SEMESTER 10							
MANDATORY INTERNSHIP	See section "Mandatory Internship" (item 10 and 10.1)	22	0	0	330	0	330
TOTAL NUMBERS IN THE SEMESTER		22	0	0	330	0	330
COMPLEMENTARY ACADEMIC ACTIVITIES							
COMPLEMENTARY ACADEMIC ACTIVITIES		4	-	-	-	-	60
COMMUNITY OUTREACH ACTIVITIES							
COMMUNITY OUTREACH ACTIVITIES		18	-	-	-	-	270
TOTAL NUMBERS OF ELECTIVES							
TOTAL NUMBERS OF ELECTIVES		16					240
TOTAL CREDIT HOURS OF THE COURSE		MINIMUM CLOCK HOURS REQUIRED BY MEC					
4140		3600					
TOTAL HOURS - MANDATORY INTERNSHIP		330					
TOTAL HOURS - COMPLEMENTARY ACADEMIC ACTIVITIES		60					
TOTAL HOURS - INTERNSHIP + COMPLEMENTARY ACADEMIC ACTIVITIES		390	MAXIMUM CLOCK HOURS ALLOWED BY MEC				828
TOTAL HOURS OF COMMUNITY OUTREACH INCLUDED IN THE CURRICULUM		420	MINIMUM CLOCK HOURS REQUIRED BY MEC				414

DISCIPLINES OFFERED BY THE COURSE	PREREQUISITE (P) / COREQUISITE (C)	CREDITS	CREDIT HOURS (CLASS HOURS)			COMMUNITY OUTREACH	TOTAL
			THEORETICAL	PRACTICE	MANDATORY INTERNSHIP		
BRAZILIAN SIGN LANGUAGE - LIBRAS I		4	60	0	0	0	60
GENETICS AND ECOLOGY	(p) General Ecology; (p) Molecular Biology	4	45	15	0	0	60
PLANT BIOCHEMISRY AND MOLECULAR BIOLOGY	(p) Molecular Biology; (p) Biochemistry II	4	45	15	0	0	60
MOLECULAR BIODIVERSITY	(p) Molecular Biology; (p) Animal and Plant Biodiversity; (p) Biodiversity and Genetics of Microorganisms	4	45	15	0	0	60
ADVANCED TOPICS IN METABOLISM AND BIOENERGETICS	(p) Biochemistry II; (p) Animal Physiology	4	45	15	0	0	60
MOLECULAR ONCOLOGY	(p) Molecular Biology; (p) Cell and Tissue Engineering	4	60	0	0	0	60
BIOLOGICAL INVASIONS	None	4	30	30	0	0	60
ENVIRONMENTAL MICROBIOLOGY	(p) Biodiversity and Genetics of Microorganisms	4	60	0	0	0	60
BIOTECHNOLOGY AND DEVELOPMENT AND BIOINPUTS	(p) Biodiversity and Genetics of Microorganisms	4	60	0	0	0	60
LABORATORY ANIMALS AND ALTERNATIVE METHODS FOR TOXICOLOGICAL AND PHARMACOLOGICAL STUDIES	(p) Morphophysiology of Vertebrates or Animal Morphology	4	60	0	0	0	60
MOLECULAR DIAGNOSTIC TECHNIQUES AND IMMUNOASSAYS IN CLINICAL ANALYSIS	(p) Molecular Biology	4	45	15	0	0	60
ADVANCED STUDIES IN PHARMACOLOGY: FROM THE BENCH TO THE PHARMACEUTIC INDUSTRY	(p) General Chemistry	4	60	0	0	0	60

BIOFACTORIES OF BENEFICIAL ORGANISMS	(p) General and Applied Entomology; (p) Biodiversity and Genetics of Microorganisms; (p) Biotechnology and Plant Enhancement; (c) Industrial Microbiology	4	60	0	0	0	60
ADVANCED TOPICS IN STEM CELL CULTURE: STEM CELL OBTENTION AND APPLICATION	(P) Cell and Tissue Engineering	4	60	0	0	0	60
SCIENTIFIC COMMUNICATION FOR ANIMAL BIOTECHNOLOGY	(p) Animal Physiology; (p) Animal Morphology; (p) General Genetics	2	30	0	0	0	30
BIOLOGICAL DATA ANALYSIS	(p) Biostatistics	2	30	0	0	0	30
BIOTECHNOLOGY APPLIED TO THE ENHANCEMENT OF DISEASE-RESISTANT PLANTS	None	4	60	0	0	0	60
HUMAN MICROBIOME	(p) Microbiology or Biodiversity and Genetics of Microorganisms	4	60	0	0	0	60
FUNGI OF BIOTECHNOLOGICAL INTEREST	(p) Biodiversity and Genetics of Microorganisms	4	60	0	0	0	60
MICROBIOLOGICAL FOOD POISONING	(p) Biodiversity and Genetics of Microorganisms	4	60	0	0	0	60
THEORETICAL BASIS FOR DIAGNOSTIC METHODS: MOLECULAR DIAGNOSIS AND IMMUNOASSAYS	(p) Molecular Biology and General and Applied Immunology	2	30	0	0	0	30
BIOTECHNOLOGY: PROFESSION AND JOB MARKET	Não há	2	30	0	0	0	30
ECOTOXICOLOGY	(p) General Ecology or Organism and Population Ecology	4	60	0	0	0	60
PLANT TISSUE AND CELL CULTURE	(p) General Genetics	4	45	15	0	0	60
ELECTIVE DISCIPLINES OFFERED BY OTHER COURSES	PREREQUISITE (P) / COREQUISITE (C)	CREDITS	CREDIT HOURS (CLASS HOURS)				TOTAL
			THEORETICAL	PRACTICE	MANDATORY INTERNSHIP	COMMUNITY OUTREACH	
TECHNOLOGY FOR FERMENTED PRODUCTS	(p) Fermentation Processes and Enzymology or Biochemical Engineering	4	30	30	0	0	60
							0