

# Applied Biotechnology Major

General Education Requirements			32* Total Units	
Course	Title	Units	Offered	
<b>GE Entry Course - 1 course needed</b>				
UNIV 101	Introduction to the General Education Experience	1	F, SP	
<b>GE Foundation Mathematics - 1 course needed</b>				
MATH 113	Elements of Calculus	3	F, SP, SM	
MATH 119A	Math of Biological Systems: a calc based approach	4	F, SP	
MATH 122B	First-Semester Calculus	4	F, SP, SM	
MATH 125	Calculus I	3	F, SP	
<b>GE Foundation Composition - 1 course or equivalent needed</b>				
ENGL 102	First-Year Composition (2nd semester)	3	SP, SM	
ENGL 108	Foundations Writing for Eng as an Additional Lang	3	F, SM	
ENGL 109H	Advanced First-Year Composition	3	F, SP, SM	
<b>GE Foundation Second Language – 2<sup>nd</sup>-semester proficiency needed</b>				
Lang Course	i.e SPAN 102, FREN 102, JAP 102...	0 - 8	Varies	
<b>GE Core Requirements - 7 courses needed</b>				
<b>Course Type</b>	<b>Exploring Perspectives</b>			
EP ART	Artist	3	F, W, SP, SM	
EP HUM	Humanist	3	F, W, SP, SM	
EP NAT	Natural Scientist	3	F, W, SP, SM	
EP SOC	Social Scientist	3	F, W, SP, SM	
<b>Course Type</b>	<b>Building Connections</b>			
BLDG CON 1	Building Connections	3	F, W, SP, SM	
BLDG CON 2	Building Connections	3	F, W, SP, SM	
BLDG CON 3	Building Connections	3	F, W, SP, SM	
<b>General Education Portfolio - 1 course needed</b>				
UNIV 301	General Education Portfolio	1	F, SP, SM	

\* The number of units is variable depending on the method of meeting writing & second language requirements.

Supporting Coursework			36 Total Units	
Course	Title	Units	Offered	
<b>1. Physics I - 2 courses needed</b>				
PHYS 102	Introduction to Physics I	3	F, SP, SM	
PHYS 181	Introductory Laboratory I	1	F, SP, SM	
<b>2. Physics II - 2 courses needed</b>				
PHYS 103	Introduction to Physics II	3	F, SP, SM	
PHYS 182	Introductory Laboratory II	1	F, SP, SM	
<b>3. General Chemistry I - 1 course needed</b>				
CHEM 151	Chemical Thinking I	4	F, SP, SM	
<b>4. General Chemistry II - 1 course needed</b>				
CHEM 152	Chemical Thinking II	4	F, SP, SM	
<b>5. Organic Chemistry I - 2 courses needed</b>				
CHEM 241A	Lectures in Organic Chemistry (1st semester)	3	F, SP, SM	
CHEM 243A	Organic Chemistry Laboratory I	1	F, SP, SM	
<b>6. Organic Chemistry II - 2 courses needed</b>				
CHEM 241B	Lectures in Organic Chemistry (2nd semester)	3	F, SP, SM	
CHEM 243B	Organic Chemistry Laboratory II	1	F, SP, SM	
<b>7. Introduction to Biology I - 4 units needed</b>				
MCB 181R	Introductory Biology I	3	F, SP, SM	
MCB 181L	Introductory Biology I Lab	1	F, SP, SM	
<b>8. Introduction to Biology II - 4 units needed</b>				
ECOL 182R	Introductory Biology II	3	F, W, SP, SM	
ECOL 182L	Introductory Biology II Lab	1	F, SP, SM	
<b>9. Introduction Stats and Data Analysis - 4 units needed</b>				
AREC 239	Intro to Statistics and Data Analysis	4	SP	

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Applied Biotechnology Major Core			19 Total Units	
Course	Title	Units	Offered	
<b>1. Microbiology - 2 courses needed</b>				
Course	Title	Units	Offered	
MIC 285R	Principles of Microbiology	4	SP	
MIC 285L	Principles of Microbiology Laboratory	1	SP	
<b>2. Introduction to Biotechnology - 3 units needed</b>				
Course	Title	Units	Offered	
PLS 340	Introduction to Biotechnology	3	F	
<b>3. Biochemistry - 3 units needed</b>				
Course	Title	Units	Offered	
BIOC 384**	Foundations in Biochemistry	3	F, W, SP, SM	
BIOC 385**	Metabolic Biochemistry	3	F, W, SP, SM	
<b>4. Fermented Food and Beverages - 3 units needed</b>				
Course	Title	Units	Offered	
NSC 371R	Fermented Foods and Beverages Lecture	3	SP	
<b>5. Communication - 3 units needed</b>				
Course	Title	Units	Offered	
ALC 422	Communicating Knowledge in Ag and the Life Sciences	3	F, SM	
ENVS 408	Scientific Writing for Env, Agr and Life Sciences	3	F, SP	
<b>6. Senior Capstone - 2 units needed</b>				
Course	Title	Units	Offered	
PLS 498C	Applied Biotechnology Senior Capstone	2	SP	

**\*\* Must take BIOC 384 or 385 for CORE, the course taken for CORE gets excluded from Emphasis Electives.**

# Applied Biotechnology Major

General Applied Biotechnology Emphasis			23 Total Units	
Course	Title	Units	Offered	
<b>1. Introduction to Biotechnology Lab - 2 units needed</b>				
PLS 340L	Biotechnology Laboratory	2	SP	
<b>2. Additional Lab Course - 1 course needed</b>				
NSC 371L	Fermented Foods and Beverages Lan	1	SP	
NSC 430L	Advanced Food Science & Microbiology Laboratory	2	F	
PLS 428L	Microbial Genetics Laboratory	2	SP	
<b>3. Genetics - 1 course needed</b>				
PLS 312	Animal and Plant Genetics	4	SP	
PLS 428R	Microbial Genetics	3	SP	
<b>4. Additional Biotechnology Course - 2 courses needed</b>				
MCB 473	Recombinant DNA Methods and Applications	4	SP	
MIC 430	Food Microbiology and Biotechnology	3	SP	
PLS 424R	Plant Biotechnology	3	SP odd years	
PLS 434	Industrial Biotechnology	3	F	
<b>5. Additional Microbiology Course - 1 course needed</b>				
MIC 328R	Microbial Physiology	3	SP	
MIC 350	Core Concepts in Molecular Microbiology	3	F	
MIC 421B	Microbiological Techniques	5	F	
MIC 329A	Microbial Diversity	3	F	
MIC 430	Food Microbiology and Biotechnology	3	SP	
PLS 428R	Microbial Genetics	3	SP	
<b>6. Electives - Number of units needed to complete the required 23</b>				
BIOC 384 **	Foundations in Biochemistry	3	F, W, SP, SM	
ECOL 326	Genomics	3	F, SM	
MCB 404	Bioethics	3	F, SP, SM	
MCB 416A	Bioinformatics and Functional Genomic Analysis	3	SP	
MCB 422	Problem Solving with Genetic Tools	3	F, SP, SM	
MCB 473	Recombinant DNA Methods and Applications	4	SP	
MIC 328L	Microbial Physiology Lab	1	SP	
MIC 328R	Microbial Physiology	3	SP	
MIC 329A	Microbial Diversity	3	F	
MIC 350	Core Concepts in Molecular Microbiology	3	F	
MIC 421B	Microbiological Techniques	5	F	
NSC 351R	Fundamentals of Food Science	3	F, SP, SM	
NSC 430L	Advanced Food Science & Microbiology Laboratory	2	F	
PLP 320	Microbiomes	3	F	
PLS 312	Animal and Plant Genetics	4	SP	
PLS 358	Plant Molecular Biology	3	SP	
PLS 415	Plant Breeding and Genetics	3	SP	
PLS 428L	Microbial Genetics Laboratory	2	SP	
PLS 428R	Microbial Genetics	3	SP	
PLS 434	Industrial Biotechnology	3	F	
PLS 449A	Plant Generics and Genomics	3	Contact Dept	

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Food and Beverage Fermentation Emphasis		23 Total Units	
Course	Title	Units	Offered
<b>1. Food and Beverage Fermentation Core - 15 units needed</b>			
MIC 430	Food Microbiology and Biotechnology	3	SP
NSC 430L	Advanced Food Science & Microbiology Laboratory	2	F
NSC 351R	Fundamentals of Food Science	3	F, SP, SM
NSC 371L	Fermented Foods and Beverages Lan	1	SP
PLS 424R	Plant Biotechnology	3	SP odd years
PLS 434	Industrial Biotechnology	3	F
<b>2. Food and Beverage Fermentation Electives - 8 units needed</b>			
ACBS 320	Principles of Dairy Product Processing and Safety	3	SP
ACBS 355	Introduction to Food Proc and Food Safety Prep Ctrls	3	F
ACBS 377	Food Toxicology	3	F
ACBS 380R	Food Safety and Microbiology	3	F
ACBS 420	Meat Animal Composition	3	SP
ACBS 437	Food Safety Laws and Legal Policies	3	F
BIOC 384**	Foundations in Biochemistry	3	F, W, SP, SM
BIOC 385**	Metabolic Biochemistry	3	F, W, SP, SM
ECOL 326	Genomics	3	F, SM
MCB 404	Bioethics	3	F, SP, SM
MCB 416A	Bioinformatics and Functional Genomic Analysis	3	SP
MIC 328R	Microbial Physiology	3	SP
NSC 308	Nutrition and Metabolism	3	F, SP, SM
NSC 310	Principles of Human Nutrition in Health and Disease	3	F, SP, SM
PLS 307	Origins of Food Plants	3	SP even years
PLS 312	Animal and Plant Genetics	4	SP
PLS 358	Plant Molecular Biology	3	SP

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Industrial Plant & Microbial Biotechnology Emphasis		23 Total Units	
Course	Title	Units	Offered
<b>1. Industrial Plant &amp; Microbial Biotech Core - 17 units needed</b>			
BIOC 384**	Foundations in Biochemistry	3	F, W, SP, SM
BIOC 385**	Metabolic Biochemistry	3	F, W, SP, SM
MIC 350	Core Concepts in Molecular Microbiology	3	F
PLS 340L	Biotechnology Laboratory	2	SP
PLS 424R	Plant Biotechnology	3	SP odd years
PLS 428L	Microbial Genetics Laboratory	2	SP
PLS 428R	Microbial Genetics	3	SP
PLS 434	Industrial Biotechnology	3	F
<b>2. Industrial Plant &amp; Microbial Biotech Electives - 6 units needed</b>			
BE 487	Metagenomics: From Genes to Ecosystems	3	SP
BIOC 384**	Foundations in Biochemistry	3	F, W, SP, SM
BIOC 385**	Metabolic Biochemistry	3	F, W, SP, SM
ECOL 326	Genomics	3	F, SM
MCB 404	Bioethics	3	F, SP, SM
MCB 416A	Bioinformatics and Functional Genomic Analysis	3	SP
MCB 422	Problem-Solving with Genetic Tools	3	F, SP, SM
MCB 473	Recombinant DNA Methods and Applications	4	SP
MIC 328L	Microbial Physiology Lab	1	SP
MIC 328R	Microbial Physiology	3	SP
MIC 329A	Microbial Diversity	3	F
MIC 421B	Microbiological Techniques	5	F
MIC 452	Antibiotics - A Biological Perspective	3	F
NSC 351L	Food Studies Laboratory	1	F, SP, SM
NSC 371L	Fermented Foods and Beverages Lan	1	SP
NSC 430L	Advanced Food Science & Microbiology Laboratory	2	F
PLP 320	Microbiomes	3	F
PLS 307	Origins of Food Plants	3	SP even years
PLS 312	Animal and Plant Genetics	4	SP
PLS 358	Plant Molecular Biology	3	SP
PLS 428L	Microbial Genetics Laboratory	2	SP
PLS 449A	Plant Generics and Genomics	3	Contact Dept

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