

# BIOMEDICAL SCIENCES - BS

Biomedical Sciences is a broad field of applied biology that is directed toward understanding health and disease. This degree is offered on both the College Station campus and at the Texas A&M Higher Education Center in McAllen, TX. Our mission is to educate students who will create a healthier future for humans and animals through the medical professions, biomedical innovation and discovery, global service and outreach. The program both emphasizes versatility in the biological and medical sciences, and prioritizes a One Health approach to education through courses that emphasize the interconnectedness of animal, human, and environmental health; while bringing together students with interest in medical careers that impact all three. A highly effective counseling program assists the students with the development of an individualized approach and course package that orients and prepares the students for entry into the medical, allied health field or graduate program of their choice. Such an approach enhances their educational experiences, improves their placement in professional and graduate programs, and facilitates their entry into the biomedical science job market.

Biomedical Sciences graduates enter professional programs in human medicine, veterinary medicine, dentistry, osteopathy, podiatry, optometry, and pharmacy. Some become medical technologists, physician assistants, nurses, and laboratory and research technicians. Others pursue radiation technology, hospital administration, and a wide variety of health-related fields. Many Biomedical Sciences students continue their education in graduate schools and specialize in various biology- and medicine-related disciplines. Other graduates are employed by clinical practices, industrial companies, government agencies, private foundations, public schools, colleges and certain aspects of business. Positions are available in pharmaceutical and drug marketing, research equipment manufacture and sales, food safety, biomedical research, disease control, zoonoses and epidemiology, laboratory animal care, zoo and aquatic animal supervision, health-related inspection and regulatory work. The BS in Biomedical Sciences is also awarded to students who complete the three year Early Admission Option to Professional Schools and one year of professional school.

## Program Requirements

### First Year

Fall		Semester Credit Hours
BIMS 101	Introduction to Biomedical Science	1
BIOL 111	Introductory Biology I <sup>1</sup>	4
CHEM 119	Fundamentals of Chemistry I <sup>1</sup>	4
Mathematics <sup>2</sup>		3-4
Social and behavioral sciences ( <a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#social-behavioral-sciences">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#social-behavioral-sciences</a> ) <sup>3</sup>		3
<b>Semester Credit Hours</b>		<b>15</b>
Spring		
BIOL 112	Introductory Biology II <sup>1</sup>	4
CHEM 120	Fundamentals of Chemistry II <sup>1</sup>	4
Select one of the following:		3
ENGL 103	Introduction to Rhetoric and Composition	
ENGL 104	Composition and Rhetoric	

ENGL 203	Writing about Literature	
ENGL 210	Technical and Professional Writing	
Mathematics <sup>2</sup>		3-4
<b>Semester Credit Hours</b>		<b>14</b>
Second Year		
Fall		
CHEM 227	Organic Chemistry I <sup>1</sup>	3
CHEM 237	Organic Chemistry Laboratory <sup>1</sup>	1
PHYS 201	College Physics <sup>1</sup>	4
POLS 206	American National Government	3
American history ( <a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#american-history">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#american-history</a> ) <sup>3,4</sup>		3
Creative arts ( <a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#creative-arts">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#creative-arts</a> ) <sup>3</sup>		3
<b>Semester Credit Hours</b>		<b>17</b>
Spring		
CHEM 228 & CHEM 238	Organic Chemistry II and Organic Chemistry Laboratory <sup>1</sup>	4
PHYS 202	College Physics <sup>1</sup>	4
POLS 207	State and Local Government	3
American history ( <a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#american-history">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#american-history</a> ) <sup>3,4</sup>		3
Language, philosophy and culture ( <a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#language-philosophy-culture">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#language-philosophy-culture</a> ) <sup>3</sup>		3
<b>Semester Credit Hours</b>		<b>17</b>
Third Year		
Fall		
BICH 409	Principles of Biochemistry	3
BIMS 320/ GENE 320	Biomedical Genetics	3
BIOL 319	Integrated Human Anatomy and Physiology I	4
Directed electives <sup>5</sup>		4
<b>Semester Credit Hours</b>		<b>14</b>
Spring		
BIOL 320	Integrated Human Anatomy and Physiology II	4
VTPB 405	Biomedical Microbiology	4
Communication ( <a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#communication">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#communication</a> ) <sup>3</sup>		3
Directed electives <sup>5</sup>		6
<b>Semester Credit Hours</b>		<b>17</b>
Fourth Year		
Fall		
STAT 302 or STAT 312	Statistical Methods <sup>6</sup> or Statistics for Biology	3
Directed electives <sup>5</sup>		7
General elective <sup>3,7</sup>		1-3
<b>Semester Credit Hours</b>		<b>13</b>

**Spring**

VTPP 427	Applied Biomedical Physiology	3
Directed electives <sup>5</sup>		10
<b>Semester Credit Hours</b>		<b>13</b>
<b>Total Semester Credit Hours</b>		<b>120</b>

<sup>1</sup> Common Body of Knowledge Courses (CBK) must be completed with a grade of C or better.

<sup>2</sup> Complete 6-8 hours of mathematics core courses.

- Select one of the following: MATH 142, MATH 147, MATH 151, MATH 171. Must be completed with a grade of C or better.
- Select one of the following: MATH 140, MATH 148, MATH 150, MATH 152, MATH 168, MATH 172, STAT 201.

<sup>3</sup> See your academic advisor for choices.

<sup>4</sup> HIST 105 and HIST 106 are recommended, however students may choose from other American History core courses.

<sup>5</sup> Must be selected in consultation with BIMS academic advisor.

<sup>6</sup> Students who complete STAT 201 in Mathematics core must take STAT 312.

<sup>7</sup> Select any course 100-499 except MATH 102-104 (<http://catalog.tamu.edu/undergraduate/course-descriptions/math/>); only 1 credit KINE 199 may be used.

In satisfying the required 30 hours of BIMS directed electives and general electives, all 285/291/485/484/491 courses may not exceed 9 credit hours. BIMS 484 may not exceed 6 total credit hours. All 289/489 courses may not exceed 9 credit hours. Restrictions to be enforced by the BIMS academic advising office.

A minimum of 36 hours of 3/400 level coursework must be completed in residence at Texas A&M University to earn a degree.

All students are required to complete 3 hours of International and Cultural Diversity (<http://catalog.tamu.edu/undergraduate/general-information/degree-information/international-cultural-diversity-requirements/>) credit (ICD) and 3 hours of Cultural Discourse (<http://catalog.tamu.edu/undergraduate/general-information/degree-information/cultural-discourse-requirements/>) (CD) credits. A course satisfying a core category, a college department requirement, or a free elective can be used to satisfy this requirement. Select in consultation with academic advisor.

All students must complete the Foreign Language requirement: two units of the same foreign language at the high school level or a two course sequence of the same foreign language at the college level. Please see the university catalog "Requirements for a Baccalaureate Degree" for further details.

## Directed Electives

Biomedical Science (BIMS) directed electives are courses that are specifically approved for the curriculum. A student may choose 27 semester credits from the following partial list of courses:

Code	Title	Semester Credit Hours
ANSC 107	General Animal Science	3
ANSC 108	General Animal Science Laboratory	1
ANSC 210	Companion Animal Science	3
ANSC 318	Animal Feeds and Feeding	3
ANSC 320	Animal Nutrition and Feeding	3

ANSC 303/ NUTR 303	Principles of Animal Nutrition	3
ANSC 326/ FSTC 326	Food Bacteriology	3
ANSC 327/ FSTC 327	Food Bacteriology Lab	1
BICH 411	Comprehensive Biochemistry II	3
BICH 412	Biochemistry Laboratory I	1
BICH 414	Biochemical Techniques I	2
BICH 431/ GENE 431	Molecular Genetics	3
BICH 432/ GENE 432	Laboratory in Molecular Genetics	2
BIMS 110	One Health in Action	1
BIMS 125	Animals in Society	1
BIMS 201	Introduction to Phenotypic Expression in the Context of Human Medicine	2
BIMS 289	Special Topics in...	1-4
BIMS 291	Research	0-4
BIMS 380	Equine-Assisted Activities and Therapies - Best Practices	3
BIMS 392	Cooperative Education in Biomedical Science	2
BIMS 481	Seminar in Biomedical Science	1
BIMS 484	Biomedical Science Field Experience	2
BIMS 485	Directed Studies	0-4
BIMS 489	Special Topics in...	1-4
BIMS 491	Research	0-4
BIMS 405/ GENE 405	Mammalian Genetics	3
BIMS 421/ GENE 421	Advanced Human Genetics	3
BIOL 401	Critical Writing in Biology	1
BIOL 402	Communicating Biological Research to the Public	1
ENTO 208	Veterinary Entomology	2
ENTO 209	Veterinary Entomology Laboratory	1
ENTO 210	Global Public Health Entomology	3
ENTO 423	Medical Entomology	2
ENTO 425	Disease Ecology	3
ENTO 431/ FIVS 431	The Science of Forensic Entomology	3
ENTO 432/ FIVS 432	Applied Forensic Entomology	1
NRSC 401/ VIBS 401	Developmental Neurotoxicology	2
NUTR 222	Nutrition for Health and Health Care	3
POSC 454	Animal Welfare	3
URPN 370	Health Systems Planning	3
VIBS 111	Biodefense, Biosecurity and Bioterrorism	1
VIBS 201/ NRSC 201	History of Neuroscience	1

VIBS 204	Fundamentals of Food Toxicology and Safety	3	VTPB 411	One Health and Tropical Ecology	3
VIBS 210	Twenty-first Century Global One Health	1	VTPB 415	Immunogenetics and Comparative Immunology	3
VIBS 211	Twenty-first Century Biological Threats	1	VTPB 438	Biomedical Virology	3
VIBS 222	Great Poisonings of the World	3	VTPB 485	Directed Studies	0-4
VIBS 243	Introductory Mammalian Histology	2	VTPB 489	Special Topics in...	1-4
VIBS 285	Directed Studies	0-4	VTPB 301/ RWF 309	Wildlife Diseases	3
VIBS 289	Special Topics in...	1-4	VTPB 460	Mammalian Cell Pathobiology	3
VIBS 305	Biomedical Anatomy	4	VTPB 487/ BIOL 487	Biomedical Parasitology	4
VIBS 310	Biomedical Writing	1	VTPP 123	Foundations of Physiology	3
VIBS 311	Biomedical Explorations through Narrative	1	VTPP 207	Methodologies of Physiology Education Research	3
VIBS 343	Histology	4	VTPP 208	Analysis and Evaluation of Physiology Education	3
VIBS 401	Developmental Neurotoxicology	2	VTPP 223	Design of Experiments for Physiology Research	3
VIBS 408	Neuroscience and Religion	3	VTPP 224	In Vitro Experimentation in Physiology Research	3
VIBS 411	Tumor Cell Biology and Carcinogenesis	3	VTPP 232	Theoretical Foundations of Health Disparities Research	3
VIBS 413	Introduction to Epidemiology	3	VTPP 233	Health Disparities Research Parameters and Analysis	3
VIBS 422	Endocrine Toxicology	4	VTPP 234	Design of Models for Physiology Research	3
VIBS 443	Biology of Mammalian Cells and Tissues	4	VTPP 235	Analysis and Validation of Models for Physiology Research	3
VIBS 445	Learning and Applying Peer Teaching Principles in Biomedical Anatomy	3	VTPP 281	Seminar	4
VIBS 447	Neurophysiology of Music	2	VTPP 285	Directed Studies	0-4
VIBS 456	Science in Cinema and Society	3	VTPP 289	Special Topics in...	1-4
VIBS 485	Directed Studies	0-4	VTPP 291	Research	0-4
VIBS 489	Special Topics in...	1-4	VTPP 404	Food Toxicology and Safety	3
VIBS 277/ NRSC 277	Essential Neuroscience - From Molecules to Nervous Systems	3	VTPP 420	Applied Pharmacology	2
VIBS 407/ NRSC 407	Core Ideas in Neuroscience	2	VTPP 423	Biomedical Physiology I	4
VIBS 424/ VTPP 424	Biomedical Neuroendocrinology and Endocrine Disorders	3	VTPP 425	Pharmacology	3
VIBS 426/ ENTO 426	Methods in Vector-Borne Disease Ecology	3	VTPP 429	Introduction to Toxicology	3
VIBS 450/ NRSC 450	Mammalian Functional Neuroanatomy	4	VTPP 438	Analysis of Genomic Signals	3
VLCS 422	Equine Disease and Epidemiology	3	VTPP 444	Practicum in Biomedical Research	3
VLCS 485	Directed Studies	0-4	VTPP 452	Fetal and Embryo Physiology	3
VSCS 485	Directed Studies	0-4	VTPP 481	Seminar	4
VTPB 212	Genetics in the News	3	VTPP 485	Directed Studies	0-4
VTPB 221	Great Diseases of the World	3	VTPP 489	Special Topics in...	1-4
VTPB 285	Directed Studies	0-4	VTPP 491	Research	0-4
VTPB 289	Special Topics in...	1-4	VTPP 401/ BMEN 400	History of Human and Veterinary Medicine in Europe	4
VTPB 303	Medical Communication in the International Community	3	VTPP 424/ VIBS 424	Biomedical Neuroendocrinology and Endocrine Disorders	3
VTPB 407	Advanced Veterinary Microbiology Laboratory	1-3	<b>Additional VMBS courses</b>		
VTPB 408	Clinical Microbiology	3	289/489, including Honors sections, 285/485 (Directed Studies), 291/491 (Research)		
VTPB 409	Introduction to Immunology	3	A complete list of all BIMS directed electives may be obtained from a BIMS advisor.		
VTPB 410	Cell Mechanisms of Disease	3			