

VETERINARY AND BIOMEDICAL SCIENCES, B.S.

Begin Campus: Any Penn State Campus

End Campus: University Park

Program Description

This major provides a strong background in those biological and physical sciences underlying contemporary veterinary science and establishes a sound foundation for graduate-level study in veterinary and related biomedical disciplines. The curriculum provides students with a deep understanding of the foundational sciences while also highlighting the science of animal and human health. Students have the option to focus their area of study through the selection of 400-level supporting courses in a variety of rigorous scientific areas including but not limited to animal health, human and comparative studies, biology, biochemistry, neurobiology, immunology, toxicology, and wildlife science.

The mission of the Veterinary and Biomedical Sciences major is to prepare students for admission to veterinary school and/or entry into graduate programs. The major can also prepare students for post-baccalaureate employment in many science related fields including biomedical research and development. Students may prepare for employment or matriculation into graduate programs in disciplines such as bioinformatics, genomics, genetics, animal nutrition, animal reproduction, microbiology, animal health, human health, physiology, biochemistry, agriculture, pharmaceuticals, biotechnology, and comparative medicine.

What is Veterinary and Biomedical Sciences?

Veterinary and Biomedical Sciences major provides a hands-on, science-heavy preparation for veterinary school and other careers in the research and allied health professions like lab and field research, industry, pharmacovigilance, pharmaceuticals, biomedical development and sales, and beyond. The Penn State Veterinary and Biomedical Sciences major resides in a small, tight-knit community united by a fascination with animal health and well-being. The major has board-certified and clinically experienced veterinarians on faculty who are experienced in various fields of clinical medicine, research, and specialties who guide, instruct, and advise VBSC students. The program also boasts world-class researchers studying topics like cancer, infectious diseases, parasitic diseases, and metabolic diseases.

You Might Like this Program If...

- an aspiring veterinarian, physician, biomedical researcher, or other biomedical professional
- interested in One Health, public health, veterinary public health, or animal health
- passionate about science and animal health
- fascinated with applying scientific principles to real-life situations and case-based study
- focused on issues like emerging infectious diseases, food and agricultural safety and production, and control and prevention of animal diseases

Entrance to Major

In order to be eligible for entrance to the Veterinary and Biomedical Sciences major a student must have:

1. attained a cumulative grade point average of at least a 2.0 and
2. completed BIOL 110, CHEM 110, CHEM 111 and earned a grade of C or better in each of these courses.
3. attained third-semester classification

Degree Requirements

For the Bachelor of Science degree in Veterinary and Biomedical Sciences, a minimum of 123 credits is required:

Requirement	Credits
General Education	45
Electives	6-10
Requirements for the Major	86-90

18 of the 45 credits for General Education are included in the Requirements for the Major. This includes: 9 credits of GN courses; 6 credits of GQ courses; 3 credits of GS courses.

Requirements for the Major

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (<https://senate.psu.edu/students/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/>).

Code	Title	Credits
Prescribed Courses		
CHEM 112	Chemical Principles II	3
CHEM 113	Experimental Chemistry II	1
MICRB 202	Introductory Microbiology Laboratory	2
PHYS 250	Introductory Physics I	4
PHYS 251	Introductory Physics II	4
VBSC 211	The Immune System and Disease	3
VBSC/BIOL 421	Comparative Anatomy of Vertebrates	4
<i>Prescribed Courses: Require a grade of C or better</i>		
ANSC 201	Animal Science	4
ANSC 301	Principles of Animal Nutrition	3
CHEM 110	Chemical Principles I	3
CHEM 111	Experimental Chemistry I	1
Additional Courses		
ANSC 423	Comparative Physiology of Domestic Animals	3
or BIOL 472	Human Physiology	
MICRB 201	Introductory Microbiology	3
or MICRB 201H	Introductory Microbiology	
STAT 200	Elementary Statistics	3-4
or STAT 250	Introduction to Biostatistics	
Select 3 credits from the following:		3
AGBM 101	Economic Principles of Agribusiness Decision Making	
BA 100	Introduction to Business	
ECON 14	Principles of Economics	
ECON 102	Introductory Microeconomic Analysis and Policy	

ECON 104	Introductory Macroeconomic Analysis and Policy	
Select 3-4 credits from the following:		3-4
BIOL 220W	Biology: Populations and Communities	
BIOL 230W	Biology: Molecules and Cells	
BIOL 240W	Biology: Function and Development of Organisms	
BMB 251	Molecular and Cell Biology I	
Select 6-8 credits from the following:		6-8
CHEM 202 & CHEM 203	Fundamentals of Organic Chemistry I and Fundamentals of Organic Chemistry II	
CHEM 210 & CHEM 212 & CHEM 213	Organic Chemistry I and Organic Chemistry II and Laboratory in Organic Chemistry	
Select 6 credits from the following:		6
BMB 211 & BMB 212 & BMB 221	Elementary Biochemistry and Elementary Biochemistry Laboratory and Applied Biochemistry	
BMB 401 & BMB 402	General Biochemistry and General Biochemistry	
<i>Additional Courses: Require a grade of C or better</i>		
BIOL 110 or BIOL 110H	Biology: Basic Concepts and Biodiversity Honors Biology: Basic Concepts and Biodiversity	4
BIOL 222 or BIOL 322	Genetics Genetic Analysis	3
MATH 140 or MATH 140B	Calculus With Analytic Geometry I Calculus and Biology I	4
MATH 141 or MATH 141B	Calculus with Analytic Geometry II Calculus and Biology II	4
VBSC 403 or VBSC 403H	Principles of Animal Disease Control Principles of Animal Disease Control	3

Supporting Courses and Related Areas

Supporting Courses and Related Areas: Require a grade of C or better

Select 9 credits of 400-level courses from department list 9

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (<https://bulletins.psu.edu/undergraduate/general-education/baccalaureate-degree-general-education-program/>) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required and Inter-Domain courses do not meet this requirement.)

- **Quantification (GQ):** 6 credits
- **Writing and Speaking (GWS):** 9 credits

Breadth in the Knowledge Domains (Inter-Domain courses do not meet this requirement.)

- **Arts (GA):** 3 credits
- **Health and Wellness (GHW):** 3 credits
- **Humanities (GH):** 3 credits
- **Social and Behavioral Sciences (GS):** 3 credits
- **Natural Sciences (GN):** 3 credits

Integrative Studies

- **Inter-Domain Courses (Inter-Domain):** 6 credits

Exploration

- **GN**, may be completed with Inter-Domain courses: 3 credits
- **GA, GH, GN, GS, Inter-Domain courses.** This may include 3 credits of World Language course work beyond the 12th credit level or the requirements for the student's degree program, whichever is higher: 6 credits

University Degree Requirements

First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (<https://senate.psu.edu/students/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/>)). For more information, check the Suggested Academic Plan for your intended program.

Program Learning Objectives

- **Critical Review of Literature:** Students will be able to search, critically evaluate, and discuss the scientific literature and popular press articles in the field of Veterinary and Biomedical Sciences.
- **Life & Physical Science Competency:** Students will exhibit competency in the physical and life sciences, including anatomy, physiology, chemistry, cell biology, microbiology, and immunology.
- **Application of Data and Knowledge:** Students will be able to apply research data and their knowledge from the physical and life sciences toward the management of health and diseases of animals.
- **Effective Communication:** Students will demonstrate effective oral and written communication to both professional and lay audiences.
- **Career Development:** Students will demonstrate knowledge of career options within the Veterinary and Biomedical Sciences and be prepared to succeed in post-graduate jobs and in professional or graduate schools.

Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information needed to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (<https://senate.psu.edu/students/policies-and-rules-for-undergraduate-students/32-00-advising-policy/>)

University Park

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Suggested Academic Plan

The suggested academic plan(s) listed on this page are the plan(s) that are in effect during the 2025-26 academic year. To access previous years' suggested academic plans, please visit the archive (<https://bulletins.psu.edu/undergraduate/archive/>) to view the appropriate Undergraduate Bulletin edition.

Veterinary and Biomedical Sciences, B.S. at University Park Campus

The course series listed below provides **only one** of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an **Academic Requirements** or **What If**

report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

Fall	Credits Spring	Credits
VBSC 50 (or First-Year Seminar)	1-3 ENGL 15 or 30H (GWS)*	3
Economics/Business Selection (GS) ¹	3 General Education selection (GA/GH/Integrated)	3
CHEM 110 (GN) ^{*2}	3 CHEM 112 (GN)	3
CHEM 111 (GN) ^{*2}	1 CHEM 113 (GN)	1
MATH 140 or 140B (GQ) [*]	4 MATH 141 or 141B (GQ) [*]	4
General Education selection (GA/GH/GHW/Integrated)	3 General Education selection (GA/GH/GHW/Integrated)	3
15-17		17

Second Year

Fall	Credits Spring	Credits
BIOL 110 (GN) ^{*2}	4 BIOL 220W, 230W, 240W, or BMB 251 (GN)	3-4
PHYS 250 (GN)	4 PHYS 251 (GN)	4
CHEM 202 or 210	3 CHEM 203 or 212 and 213W	3-5
CAS 100A, 100B, or 100C (GWS) [*]	3 ANSC 201 [*]	4
General Education selection (GA/GH/GHW/Integrated)	3	
17		14-17

Third Year

Fall	Credits Spring	Credits
BMB 401 or 211 and 212	3-4 BMB 402 or 221	2-3
ANSC 301 [*]	3 VBSC 211 (GN)	3
STAT 250 or 200 (GQ)	3 MICRB 201	3
BIOL 222 or 322 [*]	3 MICRB 202	2
General Education selection (GA/GH/GHW/Integrated)	3 Elective	3
	General Education selection (GA/GH/GHW/Integrated)	3
15-16		16-17

Fourth Year

Fall	Credits Spring	Credits
VBSC 421	4 VBSC 403 [*]	3
Supporting Courses (see department list) [*]	6 BIOL 472 or ANSC 423	3
Elective	3 Electives	6
ENGL 202C (GWS) ^{*4}	3 Supporting Courses (see department list) [*]	3
16		15

Total Credits 125-132

- * Course requires a grade of C or better for the major
- ‡ Course requires a grade of C or better for General Education
- # Course is an Entrance to Major requirement
- † Course satisfies General Education and degree requirement

¹ Selected from BA 100, ECON 14, ECON 102, ECON 104, or AGBM 101

² Entrance-to-Major Requirements:

- a cumulative GPA of at least a 2.0
- earn a minimum of 29.1 credits
- completed BIOL 110, CHEM 110, CHEM 111 with a C or better

³ ENGL 202C is strongly recommended. Graduate and professional schools may require technical writing.

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy Cultural Diversity Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

General Education includes Foundations (GWS and GQ), Knowledge Domains (GHW, GN, GA, GH, GS) and Integrative Studies (Inter-domain) requirements. N or Q (Honors) is the suffix at the end of a course number used to help identify an Inter-domain course, but the inter-domain attribute is used to fill audit requirements. Foundations courses (GWS and GQ) require a grade of 'C' or better.

All incoming Schreyer Honors College first-year students at University Park will take ENGL 137H/CAS 137H in the fall semester and ENGL 138T/CAS 138T in the spring semester. These courses carry the GWS designation and satisfy a portion of that General Education requirement. If the student's program prescribes GWS these courses will replace both ENGL 15/ENGL 30H and CAS 100A/CAS 100B/CAS 100C. Each course is 3 credits.

Advising Notes:

- Courses with 497 numbers and 500 level courses MAY be eligible for substitution for the above list. Consult your adviser *and* the program coordinator concerning substitution *prior* to registration in the course.
- BMB selection follows Organic Chemistry selection. Students enrolled in CHEM 202, 203 must select BMB 211/212,/221. Students cannot receive credit for both BMB 211 and BMB 401.
- Students wishing to attend veterinary or graduate school are encouraged to select courses required for matriculation at their future institutions.

Veterinary and Biomedical Sciences, B.S. at Commonwealth Campuses

The course series listed below provides **only one** of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an **Academic Requirements** or **What If** report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

Fall	Credits Spring	Credits
AGBM 101, ECON 102, or ECON 104 [†]	3 CHEM 112 [†]	3
CHEM 110 ^{*#†}	3 CHEM 113 [†]	1
CHEM 111 ^{*#†}	1 MATH 141 ^{††}	4
MATH 140 ^{††}	4 ENGL 15, 30H, or ESL 15 ^{††}	3
General Education Course	3 General Education Course	3
First-Year Seminar	1-3 General Education Course	3
	15-17	17

Second Year

Fall	Credits Spring	Credits
BIOL 110 ^{*#†}	4 BIOL 220W, 230W, 240W, or BMB 251	3-4
CHEM 202 or 210	3 CHEM 203 or 212 <i>and</i> 213	3-5
PHYS 250	4 PHYS 251	4
CAS 100A, 100B, or 100C ^{††}	3 General Education Course	3
General Education Course	3	
	17	13-16

Third Year

Fall	Credits Spring	Credits
STAT 250 or 200	3-4 MICRB 201	3
ANSC 201 [*]	4 MICRB 202	2
BMB 401 or 211 <i>and</i> 212	3 BMB 402 or 221	2-3
BIOL 222 [*]	3 VBSC 211	3
Elective	3 ENGL 202C ^{††}	3
	General Education Course	3
	16-17	16-17

Fourth Year

Fall	Credits Spring	Credits
ANSC 301 [*]	3 BIOL 472 or ANSC 423	3
VBSC 421	4 Supporting Course 400 Level [*]	3
VBSC 403 [*]	3 Elective	3
Supporting Course 400 Level [*]	3 Elective	3
Supporting Course 400 Level [*]	3 Elective	3
	16	15

Total Credits 125-132

* Course requires a grade of C or better for the major

‡ Course requires a grade of C or better for General Education

Course is an Entrance to Major requirement

† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy Cultural Diversity Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

General Education includes Foundations (GWS and GQ), Knowledge Domains (GHW, GN, GA, GH, GS) and Integrative Studies (Inter-domain) requirements. N or Q (Honors) is the suffix at the end of a course number used to help identify an Inter-domain course, but the inter-domain attribute is used to fill audit requirements. Foundations courses (GWS and GQ) require a grade of 'C' or better.

Advising Notes:

- Students should consult with an academic adviser regarding selection of CHEM 202 and CHEM 203 versus CHEM 210, CHEM 212, and CHEM 213.
- If completing CHEM 212, CHEM 213 must also be completed.
- The BMB selection should be based on the student's Organic Chemistry selection. In most cases, students enrolled in CHEM 202 and 203 course select BMB 211, BMB 212, and BMB 221.
- Students cannot receive credit for both BMB 211 and BMB 401.
- Students that desire to attend veterinary school or graduate school are strongly encouraged to select additional animal biology courses in their elective selections.
- Students should consult with an academic adviser regarding the appropriate selection of supporting courses. Supporting courses must be selected from an approved list.
- Students should work with an academic adviser in the development of their plan as some courses are not taught every semester.

Career Paths

The major provides a high-science education that opens doors for careers in pharmaceuticals, industry, human health fields, laboratory medicine, and research. Student often develop new interests through exposure to fields they never knew. This broad science curriculum supports career flexibility within the science field!

MORE INFORMATION ABOUT POTENTIAL CAREER OPTIONS FOR GRADUATES OF THE AGRIBUSINESS MANAGEMENT PROGRAM (<https://vbs.psu.edu/graduate/>)

Opportunities for Graduate Study

Grads thrive at top veterinary, medical, and other biomedical programs, and are recruited to work, teach, and conduct biomedical research across numerous STEM and animal health industries. The VBSC department also offers graduate study in various disciplines.

MORE INFORMATION ABOUT OPPORTUNITIES FOR GRADUATE STUDY (<https://vbs.psu.edu/graduate/>)

Contact

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