



DVM Prerequisite Guide

Candidates applying for admission to the Doctor of Veterinary Medicine Program at CSU must complete the following prerequisite courses with a grade of C- or better by the July before matriculation.

PREREQUISITE REQUIREMENTS	Semester Credits (minimum)
Biological Sciences	
Laboratory associated with a biological sciences course	1
Genetics (no longer requires a biology prerequisite) NEW!	3*
Cell Biology NEW!	3*
Systems Physiology -OR- Anatomy & Physiology I & II NEW! (lab is not required)	3* credits of Systems Physiology -OR- 2 courses of A&P
'Additional' Biomedical Science courses (upper division) – details below NEW!	9*
Physical Sciences	
Laboratory associated with a chemistry class	1
Biochemistry (must require organic chemistry as a prerequisite)	3*
Physics with laboratory	4
Math	
Statistics (upper division course preferred - calculus is not a substitute)	3*
Arts & Humanities/Behavioral & Social Sciences	
English Composition	3
Art, dance, English, humanities, foreign language, music, philosophy, speech, theater, anthropology, economics, geography, history, political sciences, psychology, sociology, etc	12
Other	
Electives	15
Total	60

*4 quarter credits will fulfill 3 semester credit requirements

1) TO FULFILL A PREREQUISITE

- A course will satisfy a prerequisite as long as it is taken at a CHEA, [council for higher education accreditation](#), institution.
- The course description, content level, prerequisites, number of credits, and a grade of C- or above must meet the requirements as stated in this document, pages below.
- Online courses are accepted if they are taken for credit with a grade and show as completed on an official transcript. Courses taken at vocational and proprietary schools will not be accepted.

2) COURSE SUBSTITUTION

- If after reading our course descriptions (pages below) you are still not sure if a particular course will meet our prerequisite requirement, you can submit a [Course Substitution Request Form](#).

3) COURSE SUBSTITUTION FORM

- Use the "Course Substitution Request Form" to send your course information as an email attachment to DVMAdmissions@colostate.edu. Include all information requested in the form fields. Incomplete forms will be returned for additional information and delay processing. The following information is required:
 - Course title and number of the course you plan to take or have taken
 - Prerequisite course title(s) of the course listed above
 - Institution Name
 - Number of credits (indicate semester/quarter)

- Grade received
- Course level (FR, SO, JR, SR, GR)
- Course description
- Any supporting information (eg. Course Syllabus) may also be sent as an email attachment with the Course Substitution Request.
- **If your Course Substitute Request is approved**, provide a one-sentence statement to explain the course approval in the “Special Circumstances” section of the Colorado Supplemental Application.

4) **ENGLISH COMPOSITION**

The following must appear on an official transcript:

- Completion of a four-year degree (ie: Bachelor of Science) will fulfill the English Composition requirement. No course substitution request form is required for this substitution.
- “English Literature” does not qualify
- AP English Composition (not AP English Literature) will fulfill the English Composition requirement

5) **NEW! ‘ADDITIONAL’ BIOMEDICAL SCIENCE COURSES** (9 credits)

- Completing upper division Biomedical Science courses is essential to strengthening an application. Candidates having completed at least 9 credits of upper division Biomedical Science courses with a grade at the time of application will be given preferred consideration.
- Additional upper division Biomedical Science courses **includes** junior-level undergraduate courses or higher-level courses in the following subject areas: anatomy, cancer biology, developmental biology, endocrinology, epidemiology, histology, immunology, infectious disease, metabolism, microbiology, molecular biology, necropsy, neurology/neuroscience nutrition, organ physiology, parasitology, pathology, pharmacology, toxicology, virology. Additional upper division credits - beyond the specifically required (above) credits in biochemistry, cell biology, genetics, and systems physiology - will count toward this 9-credit requirement.
- Although additional upper division Biomedical Science courses may have great personal and professional benefit for the individual pre-veterinary candidate, the following subjects **will not** be accepted as ‘Additional Biomedical Science’ courses: animal disease prevention/management, behavior, biometry, communication, conservation biology, dairy/beef systems, ecology, equine/livestock management, equine science, evolution, herpetology, human-animal interactions, ichthyology, insemination, lab animal science, mammalogy, oceanography, ornithology, poultry science, small animal science, swine science, vet laboratory principles, welfare, and zoology.

6) **COURSES WITH A GRADE**

- When reviewing an application, the admissions committee will evaluate only completed courses (with a grade) at time of application. Grades earned after application will not be considered during the application review. Do not directly submit additional grades to the program via email unless requested by the Office of Veterinary Admissions.

7) **IN PROGRESS COURSES**

- For candidates who receive an offer or alternate status, transcripts will be audited by the Office of Veterinary Admissions for *grades that were in progress* at the time of application. CVMBS reserves the right to rescind an offer of admission or alternate status if at any time prior to DVM program matriculation there are negative changes from previous academic performance or if official transcripts do not validate VMCAS-reported course/grade listings. Additional information may be requested from instructors of coursework under review.

8) **COMPLETION OF PREREQS**

- Candidates can apply before completing all required courses and may be admitted under *provisional* admission. If *provisionally* admitted, final transcripts must be received by July 15 of the year you matriculate. Provisional admission may be granted for the following in-progress prerequisites: biochemistry, biology lab, cell biology, chemistry lab, genetics, physics, statistics, and systems physiology.

9) **OLDER COURSEWORK**

- Biochemistry, cell biology, genetics, and systems physiology are required to be taken within the last ten years. All other prerequisite requirements are recommended to be within ten years. A recent demonstration of an ability to handle an upper division biomedical science curriculum is strongly encouraged.

10) **INTERNATIONAL COURSEWORK**

- International transcripts (including Frech-speaking Canadian schools) must be electronically processed through the [World Education Services](#) (WES) credential evaluation services and received by VMCAS before SEP 15. Please request a “course-by-course” evaluation.

SAMPLE COURSE DESCRIPTIONS
AT COLORADO STATE UNIVERSITY

BIOCHEMISTRY – ONE OF THE FOLLOWING COURSES:

To fulfill the Biochemistry prerequisite, an equivalent course must be considered upper division at your institution, it must require organic chemistry (either one semester or two) as a biochemistry prerequisite, the title must indicate it is primarily a biochemistry course, and it must be the equivalent of 3 semester credits or more.

BC351 - 4 semester credits - Principles of Biochemistry

Prerequisite: BZ110 or BZ120 or LIFE102; CHEM245 or CHEM341 or CHEM345

Structure and function of biological molecules; biocatalysis; metabolism and energy transduction; gene expression.

BC401 - 3 semester credits - Comprehensive Biochemistry I

Prerequisite: CHEM245 or CHEM343 or concurrent registration in CHEM346; MATH155 or MATH160

Macromolecular structure and dynamics; membranes; enzymes; bioenergetics.

CELL BIOLOGY – ONE OF THE FOLLOWING COURSES: **NEW!**

To fulfill the Cell Biology prerequisite, an equivalent course must have a title that indicates it is primarily a cell biology course, and it must be the equivalent of 3 semester credits or more.

LIFE 210 – 4 semester credits - Introductory Eukaryotic Cell Biology

Prerequisite: CHEM 111 and CHEM 112 and LIFE 102

Structure and function of macromolecules focusing on proteins and lipid bilayers. Cellular composition, organelles, and trafficking between them. Basic metabolism, cell signaling and proliferation control.

BZ 310 – 4 semester credits – Cell Biology

Prerequisite: (BZ 110 or BZ 120 or LIFE 103) and (CHEM 113)

Structure and function of cells emphasizing molecular mechanisms. Communication, metabolism, motility, genetics, growth, and reproduction.

CM 501 -4 semester credits - Advanced Cell Biology

Prerequisite: BZ 310

Cell structure and organelle function. Cell structure and organelle function.

MIP 250 - 3 semester credits - Eukaryotic Microbiology

Prerequisite: CHEM 111 and LIFE 102

Cell biology topics with emphasis on eukaryotic microbes. It is a lower division course that covers cell biology topics with emphasis on eukaryotic microbes. Topics include the central dogma of molecular biology, cell structure and function, and cell membranes as they relate to the importance of the host cell as well as parasites. Spotlight microbes will be studied that depict many eukaryotic processes important in cell biology, human health, and scientific models.

GENETICS – ONE OF THE FOLLOWING COURSES:

To fulfill the Genetics prerequisite, an equivalent course must have a title that indicates it is primarily a genetics course, and it must be the equivalent of 3 semester credits or more.

ANEQ328 – 3 semester credits - Foundations in Animal

Genetics Prerequisite: ANEQ101 or ANEQ102; LIFE 102

Foundational information of the influence of the genome and its genes on qualitative and quantitative traits in animal populations.

ANEQ330 – 3 semester credits – Principles of Animal Breeding

Prerequisite: BZ350, ANEQ328 or SOCR330; or at least 3 credits of STAT200-279 or STAT300-379

Genetic principles underlying animal improvement; elementary population genetics, heritability; selection response; mating systems; DNA markers.

BC353 – 4 semester credits – Pre-Health

Genetics Prerequisite: BC351

Applies and extends the biochemical concepts learned in BC351 to macromolecules and molecular processes based on nucleic acids.

BZ350 - 4 semester credits - Molecular and General Genetics

Prerequisite: LIFE102, BZ110 or BZ120 and STAT201

Primarily for students in biological sciences, Mendelian, molecular, and population genetics emphasizing the molecular basis of genetics.

BZ455 - 3 semester credits - Human Heredity and Birth

Defects Prerequisites: BZ110, BZ111 or LIFE103

Human heredity and its individual and social implications; causes of congenital defects.

BC463 - 3 semester credits - Molecular Genetics

Prerequisites: BC351, BZ350, LIFE201B, BC401

Molecular basis of gene structure, replication, repair, recombination, and expression.

MIP450 - 3 semester credits - Microbial Genetics

Prerequisite: MIP300 (General Microbiology); BC351 or BC401

Principles of genetics at molecular level: mutation, recombination, complementation, suppression, control of gene expression, & recombinant DNA.

SOCR330 - 3 semester credits - Principles of Genetics

Prerequisite: BZ110 or BZ120 or LIFE102

Transmission, population, and molecular genetics; practical applications.

LIFE 201B - 3 semester credits - Introductory Genetics: Molecular/Immunological/Developmental (GT-SC2)

Prerequisite: LIFE 102

Introduction to genetics, with emphasis on structure, regulation, and replication of genomes, and on genetic control of cell cycles, including development and cancer.

PHYSICS - ONE OF THE FOLLOWING COURSES:

To fulfill the Physics prerequisite, an equivalent course must have a title that indicates it is primarily a physics course, it must have a laboratory component, and it must be the equivalent of 4 semester credits or more including the lab. Only one physics course with lab is required. The second course of a two-part physics series is not required.

PH110+PH111 – 4 semester credits - Descriptive Physics + Laboratory

Prerequisite: none for PH110. For PH111, PH110 is a prereq or concurrent registration

Conceptual aspects of physics applied to phenomena in everyday life and to problems in other fields of science. Credit not allowed for both PH110 and PH121.

PH121 - 5 semester credits - General Physics I

Corequisite: MATH125, MATH155, MATH157 or MATH160

Concepts of force, torque, energy, momentum, work used to cover fluids, waves, sound, temperature, heat; biological, physical examples (non-calculus).

PH122 - 5 semester credits - General Physics II

Prerequisite: PH121 or PH141

Electricity including electrostatics and simple circuits; magnetism; optics; nuclear physics, radiation; biological, physical examples (noncalculus).

PH141 - 5 semester credits - Physics for Scientists and Engineers I

Prerequisite: MATH126; MATH155, MATH159 or MATH160

Forces, energy, momentum, angular momentum, oscillations, waves, heat, thermodynamics (calculus based).

PH142 – 5 semester credits – Physics for Scientists and Engineers

Prerequisite: PH141 and (MATH161, MATH255, or MATH271)

Electricity and magnetism, circuits, light, optics (calculus based).

STATISTICS – ONE OF THE FOLLOWING COURSES:

To fulfill the Statistics prerequisite, an equivalent course must have a title that indicates it is primarily a statistics course and it must be the equivalent of 3 semester credits. Calculus courses will not substitute.

STAT301 - 3 semester credits - Introduction to Statistical Methods

Prerequisite: MATH118 (College Algebra)

Techniques in statistical inference; confidence intervals, hypothesis tests, correlation and regression, analysis of variance, chi-square tests.

STAT307 - 3 semester credits - Introduction to Biostatistics

Prerequisite: MATH, 117 or 118 or 124 or 125 or 126 or 141 or 155 or 160

Biostatistical methods; confidence intervals, hypothesis tests, simple correlation and regression, one-way analysis of variance.

SYSTEMS PHYSIOLOGY – ONE OF THE FOLLOWING COURSES or an *Anatomy and Physiology Series*/two courses (not available at CSU): **NEW!**

To fulfill the Systems Physiology prerequisite, an equivalent course must have a title that indicates it is primarily a physiology course, and it must be the equivalent of 3 semester credits or more. Physiology can be awarded for a single general Human Physiology or Animal Physiology course that is comprehensive and includes the following body systems: cardiovascular, digestive, endocrine, musculoskeletal, neurological, renal, reproductive, and respiratory. **Your institution may require that you take two general physiology courses to cover all systems.** Alternatively, you may take a two-part, combined Anatomy & Physiology series (2 quarters/semesters; must complete both courses to fulfill the requirement. Lab is not required. This option not available at CSU).

ANEQ 305 - 3 semester credits - Functional Large Animal Physiology

Prerequisite: (LIFE 100 to 199 - at least 3 credits) and (CHEM 107 or CHEM 111)

Concepts of large animal physiology; emphasis on growth, digestion, and reproduction.

BMS 300 – 4 semester credits - Principles of Human Physiology

Prerequisite: (BZ 101 or BZ 110 or LIFE 102) and (CHEM 103 or CHEM 107 or CHEM 111)

Physiology of humans.

BMS 360 – 4 semester credits - Fundamentals of Physiology

Cell, tissue, and organ function related to integrated whole-body function.

BZ 401 - 3 semester credits Comparative Animal Physiology

Prerequisite: BZ 214

Physiological mechanisms of digestion, metabolism, osmoregulation, excretion, circulation, and respiration in vertebrate and invertebrate animals.

'Additional' upper division Biomedical Science Courses (9 credits) **NEW!**

This list is not exhaustive and is designed to provide examples of courses that will be accepted as 'Additional' upper division Biomedical Science courses. This list primarily contains undergraduate courses, however graduate courses of similar content are acceptable. Note that "Biomedical Science" indicates a general type of foundational science course and does not indicate a specific departmental/college prefix.

Additional upper division Biomedical Science credits - beyond the specifically required (above) credits in biochemistry, cell biology, genetics, and systems physiology - will count toward this 9 credit requirement. For example, if you take a genetics course that fulfills the genetics requirement (above) and then take another advanced genetics-based course, those additional credits may be applied to the 9 credit requirement.

Upper level labs that pair with an upper level biomedical course will be included in counting toward this 9 credit requirement. For example, 4 credits will be recognized if a 1 credit upper level microbiology lab course is taken in addition to its 3 credit upper level microbiology lecture course.

ANEQ 320 Principles of Animal Nutrition Credits: 4

Prerequisite: (ANEQ 230 or BMS 300 or BMS 360 or ANEQ 305) and (CHEM 100 to 199 - at least 3 credits)

Understanding of nutrients and nutrient function required to support animal life through all physiological states.

ANEQ 443 Applied Equine Nutrition Credits: 2

Prerequisite: ANEQ 345

Applying principles of nutrition to feeding horses in different physiological states to promote their health and well-being.

ANEQ 551 Field Necropsy Credits: 2

Prerequisite: (ANEQ 230 or BMS 300 or ANEQ 305) and (VS 313 or ANEQ 346 or MIP 315 or ANEQ 313)

Field necropsy techniques for collection of animal tissues for submission to a diagnostic laboratory.

ANEQ 522 Animal Metabolism Credits: 3

Prerequisite: CHEM 346 or CHEM 245 and CHEM 246

Nutrient digestion, absorption, transport and metabolism in monogastric and ruminant domestic species as affected by physiological changes.

BMS 301 Human Gross Anatomy Credits: 5

Prerequisite: BZ 110 or LIFE 102

Structure and function of the human body. Study of prosected human cadavers; clinical applications; living anatomy.

BMS 305 Domestic Animal Gross Anatomy Credits: 4

Prerequisite: BZ 110 or LIFE 102

Comparative gross anatomy of domestic carnivores, ruminants, and horses.

BMS 325 Cellular Neurobiology Credits: 3

Prerequisite: BMS 300 or BMS 360

Cellular and molecular bases of nervous system function and behavior.

BMS 330 Microscopic Anatomy Credits: 4

Prerequisite: BMS 300 or BMS 360

Microscopic anatomy of mammalian tissue.

BMS 345 Functional Neuroanatomy Credits: 4

Prerequisite: BMS 300 or BMS 360

Functional systems and circuits of the human brain and spinal cord.

BMS 405 Nerve and Muscle-Toxins, Trauma and Disease Credits: 3

Prerequisite: BMS 325 or BMS 345

Structure, composition, function of nerves and muscles, etiology of genetic and autoimmune neuromuscular diseases, alteration by toxins and nerve gas.

BMS 409 Human and Animal Reproductive Biology Credits: 3

Prerequisite: BMS 300 or BMS 360

Basis for male and female reproductive function in humans and animals.

BMS 420 Cardiopulmonary Physiology Credits: 3

Prerequisite: BMS 300 or BMS 360

Normal and pathophysiology of cardiovascular and pulmonary systems.

BMS 425 Introduction to Systems Neurobiology Credits: 3

Prerequisite: BMS 325

Functional organization of the nervous system at the circuit level in producing simple and complex behaviors, sensations and cognition.

BMS 430 Endocrinology Credits: 3

Prerequisite: BMS 300 or BMS 360

Physiology of the glands of internal secretion.

BMS 450 Pharmacology Credits: 3

Prerequisite: (BMS 300 or BMS 360) and (BC 351 or LIFE 210)

Pharmacologic principles, absorption, distribution, metabolism, excretion, side effects, and actions of drugs.

BMS 460 Essentials of Pathophysiology Credits: 3

Prerequisite: BMS 300 or BMS 360

Integration of different facets of mechanisms underlying health and disease.

BZ 311 Developmental Biology Credits: 4

Prerequisite: BZ 310

Developmental aspects of growth and differentiation stressed in higher plants and animals.

BZ 418 Ecology of Infectious Diseases Credits: 4

Prerequisite: LIFE 320

This course is predominantly an infectious disease course and will examine the distribution and determinants of disease, the control of health problems, and the work required to understand disease outbreaks, especially zoonoses. It will use ecological theory to understand infectious disease emergence and spread in human, veterinary and wildlife systems. Using a One Health approach to examine how interdisciplinary collaborations can create innovative solutions to health issues that simultaneously benefit animals, people and the environment.

VS 331 Histology Credits: 4

Prerequisite: BZ 100 or LIFE 102

Analysis of animal cells, tissues, and organs emphasizing light microscopy.

VS 333 Domestic Animal Anatomy Credits: 4

Prerequisite: BZ 110 or LIFE 102

Comparative functional anatomy of the dog, horse, and cow.

VS 510/MIP 510 Cancer Biology Credits: 3

Prerequisite: BC 351 or BC 403 or BZ 310 or CM 501

Cancer biology will address each of the hallmarks of cancer, including sustained proliferative signaling, evasion of growth suppression, invasion and metastasis, replicative immortality, angiogenesis, resisting cell death, genome instability and mutation, tumor promoting inflammation, deregulation of cellular energetics and avoidance of immune destruction. Lectures will integrate the biology behind these hallmarks with strategies for the treatment and prevention of cancer.

VS 533/MIP 533. Epidemiology of Infectious Diseases/Zoonoses Credits: 3

Prerequisite: MIP 300

Also Offered As:

Epidemiologic features of infectious and parasitic diseases that have a major impact on community medicine.

ERHS 332 Principles of Epidemiology Credits: 3

Prerequisite: STAT 301 or STAT 307

Use of epidemiological methods in studying distribution of diseases in human populations.

ERHS 340 Cancer Biology, Medicine, and Society Credits: 2

Prerequisite: LIFE 102 or LIFE 162 or LIFE 210

Overview of the molecular mechanisms of cancer biology and genetics. Introduction to cancer medicine and the societal issues of cancer.

ERHS 430 Human Disease and the Environment Credits: 3

Prerequisite: (BMS 300 or BMS 360) and (MIP 300) and (STAT 301 or STAT 307)

Overview of the human diseases which are associated with the environment.

MIP 300 General Microbiology Credits: 3

Prerequisite: (BZ 110 or BZ 120 or LIFE 102) and (CHEM 245 or CHEM 341 or CHEM 345)

Structure, function, development, physiology, and molecular biology of microorganisms emphasizing bacteria.

MIP 315 Pathology of Human and Animal Disease Credits: 3

Prerequisite: BZ 110 or LIFE 102

Biological systems critical to mammalian physiology and how each is affected by metabolic, genetic, environmental, and infectious agents.

MIP 342 Immunology Credits: 4

Prerequisite: (BZ 310 or BZ 350 or LIFE 201B or LIFE 210 or MIP 250) and (CHEM 245 or CHEM 341 or CHEM 345) and (MIP 300)

Principles of immunology: components of the immune system, interactions of humoral and cellular elements, and clinical applications of basic concepts.

MIP 351 Medical Bacteriology Credits: 3

Prerequisite: MIP 342

Bacteria which cause human and veterinary diseases; host-parasite relationships, disease mechanisms, prevention, and therapy.

MIP 420 Medical and Molecular Virology Credits: 4

Prerequisite: (MIP 342) and (BC 351 or BC 401)

Principles of animal virology: structure, classification, assay, diagnosis, control, replication, genetics, host-parasite relationships.

MIP 462/BZ 462. Parasitology and Vector Biology Credits: 5

Prerequisite: (BZ 110 or LIFE 103) and (MIP 302 or LIFE 206 or BZ 212)

Protozoa, helminthes, and insects and related arthropods of medical importance; systematics, epidemiology, host damage and control.

MIP 555 Principles and Mechanisms of Disease Credits: 3

Prerequisite: BMS 300

Principles of disease processes; emphasis on reactivity of the diseased cell, tissue, organ, or organism.

MIP 563 Biology of Disease Vectors Credits: 3

Prerequisite: MIP 462 or BSPM 462 or BZ 462

Vector physiology and genomics, new strategies in vector control, and vector/host interactions.

NR 367 Concepts in Vertebrate Nutrition Credits: 3

Prerequisite: CHEM 245

Concepts in suborganismal and organismal vertebrate nutrition; introduction to nutritional ecology.