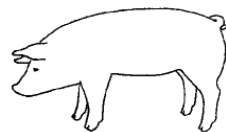
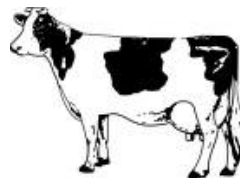
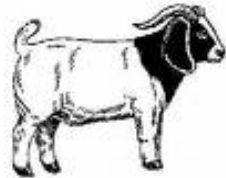
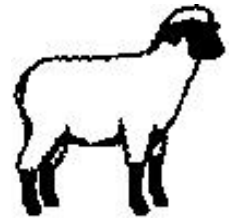
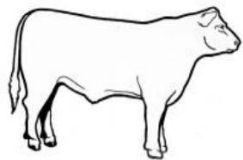


# Bachelor of Science (B.S.) in Animal Science



## FOCUS

Animal Science is the study of domestic mammals (horses, cattle, sheep, goats, pigs, dogs, and cats). Our courses utilize the nearby Animal Educational Units (teaching farms) to give our students **hands-on experience** with domestic mammals.

## CAREERS

- Some graduates continue their education to earn a Doctor of Veterinary Medicine degree or to earn a Master's or Ph.D. degree. Others have maintained a science interest, but have chosen to focus on humans by going to med school, dental school, pharmacy school, nursing school, physical therapy school, etc.
- Others may choose to work for a pharmaceutical company, a feed company, or in another related industry in sales, marketing, research, journalism, or technical support.
- Some of our graduates work for the Cooperative Extension service as livestock agents or as 4-H agents.
- Those with a business interest may own or manage a stable, farm, or kennel.
- Some graduates have gone into teaching and have earned their teaching certificates post-graduation.
- We have graduates working for state and federal departments of agriculture.
- The B.S. in Animal Science gives students a strong science background combined with practical hands-on experience.

## COURSES

The B.S. in Animal Science requires 121 credit hours, 30 credits of which are Animal Science courses. Students choose one of two concentrations:

- The Science concentration in Animal Science has the required courses for vet school and med school built into it.
- The Industry/Business concentration incorporates agricultural business classes and gives students more flexibility with their electives.

## OTHER OPPORTUNITIES

- Clubs
  - T** Animal Science Club
  - T** Collegiate Horseman's Association
  - T** Companion Animal Club
  - T** Dairy Science Club
  - T** Equestrian Club
  - T** Pre-vet Club
  - T** Rodeo Club
- Undergraduate Research
- Internships
- Teaching Assistant Opportunities
- Study Abroad
- National Student Exchange
- Hands-on Animal Experience

[http://www.cals.ncsu.edu/an\\_sci/home/teaching.htm](http://www.cals.ncsu.edu/an_sci/home/teaching.htm)

Dr. Jeannette Moore, Undergraduate Teaching Coordinator  
Jeannette\_Moore@ncsu.edu 919-515-3028

# BACHELOR OF SCIENCE (B.S.) IN ANIMAL SCIENCE\*\*

(For students who first enrolled Summer 2009 or later)

Department of Animal Science, College of Agriculture & Life Sciences  
North Carolina State University, Raleigh, NC 27695-7621  
[http://www.cals.ncsu.edu/an\\_sci/home/teaching.htm](http://www.cals.ncsu.edu/an_sci/home/teaching.htm)

The B.S. degree in Animal Science at North Carolina State University prepares students for a wide variety of careers. Students choose the Science Concentration if they are interested in vet school, med school, graduate school, or a science-based career such as working for a pharmaceutical company. Students choose the Industry/Business concentration if they are interested in the business and management aspects of a career.

Of the 121 credit hours required for completion of the degree, 87 credits are common to both concentrations and 34 credits are specific for each concentration. Students must choose one of the two concentrations.

## Courses required for all Animal Science Majors (87 credits):

Credit

Hours    Title

### **ORIENTATION** (1 credit)

- 1 . . . ALS 103, Introductory Topics in Ag & Life Sciences (freshmen) or  
ALS 303, Professional Development & Career Opportunities (transfer students with  $\geq 45$  credits)

### **COMMUNICATION** (3 credits)

- 3 . . . COM 110, Public Speaking or COM 112, Interpersonal Communication or  
COM 211, Argumentation and Advocacy

### **MATH AND NATURAL SCIENCES** (21 credits) - Also see Concentration Requirements on Page 3

- 3 . . . MA 107, Precalculus I - **Grade of C-minus or higher required**
- 3 . . . ST 311, Intro to Statistics or ST(BUS) 350, Economics and Business Statistics
- 4 . . . BIO 181, Introductory Biology: Ecology, Evolution, and Biodiversity & lab
- 4 . . . BIO 183, Introductory Biology: Cellular and Molecular Biology & lab
- 3 . . . CH 101\*\*, Chemistry - A Molecular Science - **Grade of C-minus or higher required**
- 1 . . . CH 102, General Chemistry Laboratory (lab for CH 101) - CH 101 is a co-requisite
- 3 . . . Genetics: ANS 215\*, Basic Ag Genetics (Fall only) or GN 311, Principles of Genetics (GN 311 is a required course for N.C. State University's College of Veterinary Medicine)

### **FREE ELECTIVES** (9 credits) - Free electives may be taken on a credit-only basis (S/U grading) if desired.

Free electives can be fulfilled with any non-remedial courses offered by the university.

A student may earn up to 6 credit hours of free electives for any combination (maximum 3 hours per experience) of  
ANS 492 (External Learning Experience such as a Summer Internship) or  
ANS 493 (On-campus Learning Experience such as Teaching Assistant or Undergraduate Research).

### **GEP (GENERAL EDUCATION PROGRAM) COURSES** (23 credits)

See: <http://www.ncsu.edu/uap/academic-standards/gep/courselists/index.html> for course listings

- 4 . . . ENG 101, Academic Writing and Research - **Grade of C-minus or higher required**
- 6 . . . Humanities electives
- 3 . . . Social Science elective (choose a course that is not on the Economics list)
- 2 . . . PE and Healthy Living
- 3 . . . Additional Breadth course from Humanities, Social Sciences, or Visual & Performing Arts
- 5 . . . Interdisciplinary Perspectives courses
- 0 . . . GEP U.S. Diversity co-requisite
- 0 . . . GEP Global Knowledge co-requisite
- 0 . . . Foreign Language Proficiency co-requisite

### **ECONOMICS** (credit hours are included in the Major Requirements credit hours)

- 3 . . . Economics: ARE 201, Introduction to Agricultural & Resource Economics or  
EC 201, Principles of Microeconomics or EC 205, Fundamentals of Economics

Students are encouraged to take at least one Ethics course as part of their Humanities/ Social Sciences, Additional Breadth, Interdisciplinary Perspectives, or Free Electives.

Credit  
Hours      Title

**MAJOR REQUIREMENTS** (30 credits; 27 credits of ANS plus 3 credits of Economics)

- 4 . . . ANS 150, Introduction to Animal Science lecture (Fall, Spring) - **Grade of C-minus or higher required** and ANS 151, Introduction to Animal Science lab (Fall, Spring) - ANS 150 is a co- or pre-requisite
- 4 . . . ANS 205, Physiology of Domestic Animals lecture (Fall, Spring) and ANS 206, Anatomy of Domestic Animals lab (Fall, Spring) - ANS 205 is a co- or pre-requisite
- 4 . . . ANS 220, Reproduction and Lactation in Domestic Animals lecture (Fall, Spring) and ANS 221, Repro and Lactation in Domestic Animals lab (Fall, Spring) - ANS 220 is a co- or pre-requisite
- 4 . . . ANS 230, Nutrition of Domestic Animals lecture (Fall, Spring) and ANS 231, Nutrition of Domestic Animals lab (Fall, Spring) - ANS 230 is a co- or pre-requisite
- 5 . . . Animal Science electives: Any letter-graded Animal Science (ANS) courses (except ANS 225, 301, 480) that are not fulfilling another requirement can fulfill the credit hours for Animal Science elective category.
- 3 . . . Animal Management course++
- 3 . . . Animal Science Discipline course●

Animal Science courses:

ANS 105	Introduction to Companion Animals (Fall, Spring; also online) - 3 credits
ANS 110	Introduction to Equine Science (Fall, Spring; online in summer) - 3 credits
ANS 201 (lab)	Techniques of Animal Care (Spring) - 2 credits
ANS(HS) 215*	Basic Agricultural Genetics (Fall) - 3 credits
ANS 303 & lab	Principles Equine Evaluation (Spring) - 2 credits
ANS 304 & lab	Dairy Cattle Evaluation (Spring) - 2 credits
ANS 309 & lab	Livestock Evaluation (Spring) - 3 credits
ANS(FS) 322 & lab	Muscle Foods & Eggs (Fall) - 3 credits
ANS(FS) 324 (online)	Milk and Dairy Products (Fall online, Spring online) - 3 credits
ANS 330	Laboratory Animal Science (Spring) - 3 credits
ANS 400 & lab**	Companion Animal Management (Spring) - 3 credits
ANS 402 & lab**	Beef Cattle Management (Spring) - 3 credits
ANS 403 & lab**	Swine Management (Fall) - 3 credits
ANS 404 & lab**	Dairy Cattle Management (Fall, odd years) - 3 credits
ANS 408 & lab**	Small Ruminant Management (Fall, even years) - 3 credits
ANS 410 & lab**	Equine Management (Spring) - 3 credits
ANS 411 & lab**	Management of Growing and Performance Horses (Fall) - 3 credits
ANS(NTR, PO) 415●	Comparative Nutrition (Fall; also online in fall, spring, and summer) - 3 credits
ANS(NTR) 419●	Human Nutrition in Health and Disease (Spring) - 3 credits
VMP 420●	Diseases of Farm Animals (Spring) - 3 credits
ANS(PO) 425 & lab	Feed Mill Management (Spring; also online in fall, spring, summer) - 3 credits
ANS 440●	Selection of Domestic Animals (Fall; also online in summer) - 3 credits
ANS 452●	Advanced Reproductive Physiology (Spring, odd years; also online) - 3 credits
ANS 453●	Growth & Development of Domestic Animals (Fall, even years) - 3 credits
ANS 454●	Lactation, Milk, and Nutrition (Spring, even years) - 3 credits
ANS 5xx●	Any 500-level letter-graded ANS course

++ *Animal Management Course*

● *Animal Science Discipline Course*

\* ANS 215 (Basic Ag Genetics) will fulfill the Genetics requirement if the student does not also take GN 311. For students who take both GN 311 and ANS 215, the ANS 215 course will fulfill 3 credits of Animal Science elective credit. The ANS 215 course will not fulfill two categories at the same time (Genetics, Animal Science elective).

\*\* Use of animals and animal specimens is critical to our educational program. To obtain full credit for Animal Science courses, students are required to participate in laboratory procedures involving animals and animal specimens. All activities with live animals are IACUC (Institutional Animal Care and Use Committee) approved. Many lectures also incorporate animals or animal specimens into the course.

## Courses required for each concentration (34 credits)

Students must select one of the two concentrations.

<b>SCIENCE CONCENTRATION</b>	<b>INDUSTRY / BUSINESS CONCENTRATION</b>
<p>3.....Additional Animal Science Discipline course<sup>•</sup> (see page 2)</p> <p>3.....MA 121, Elements of Calculus <u>or</u> MA 131, Calculus for Life and Mgt Sciences A</p> <p>3.....CH 201, Chemistry - A Quantitative Science 1.....CH 202, Quantitative Chemistry Laboratory 3.....CH 221, Organic Chemistry I 1.....CH 222, Organic Chemistry I Lab 3.....CH 223, Organic Chemistry II 1.....CH 224, Organic Chemistry II Lab</p> <p>4.....PY 211, College Physics I 4.....PY 212, College Physics II</p> <p>3.....MB 351, General Microbiology 1.....MB 352, General Microbiology Laboratory</p> <p>4.....CALS Group A, B, or C elective <a href="http://harvest.cals.ncsu.edu/index.cfm?showpage=25">http://harvest.cals.ncsu.edu/index.cfm?showpage=25</a> Pre-vet students: Take BCH 451, Principles of Biochemistry, to fulfill this requirement.</p>	<p>3.....Additional Animal Management course++ (see page 2)</p> <p>3.....MA 114, Intro to Finite Mathematics with Applications <u>or</u> MA 121, Elements of Calculus <u>or</u> MA 131, Calculus for Life and Mgt Sciences A</p> <p>4.....CH 220, Introductory Organic Chemistry &amp; lab <u>or</u> CH 221 &amp; CH 222, Organic Chemistry I &amp; lab</p> <p>4.....PY 131, Conceptual Physics &amp; lab <u>or</u> PY 211, College Physics I</p> <p>3.....Business Management or Marketing elective*** 6.....Economics or Business elective****</p> <p>11....CALS Group A, B, or C elective <a href="http://harvest.cals.ncsu.edu/index.cfm?showpage=25">http://harvest.cals.ncsu.edu/index.cfm?showpage=25</a> Consider completing the Ag Business Minor: <a href="http://www.ncsu.edu/advising_central/minors.html">http://www.ncsu.edu/advising_central/minors.html</a></p>
<hr style="width: 20%; margin-left: 0;"/> <p><b>34 Total credits for concentration</b></p>	<hr style="width: 20%; margin-left: 0;"/> <p><b>34 Total credits for concentration</b></p>

\*\*\* Business Management or Marketing electives for Industry/Business concentration:

- ARE 303, Farm Management
- ARE 304, Agribusiness Management
- ARE 311, Agricultural Markets
- ARE 312, Agribusiness Marketing

\*\*\*\* Economics or Business electives for Industry/Business concentration:

- ACC 200, Introduction to Managerial Accounting
- ARE 215, Small Business Accounting
- ARE 303, Farm Management
- ARE 304, Agribusiness Management
- ARE 306, Agricultural Law
- ARE 309, Environmental Law & Economic Policy
- ARE 311, Agricultural Markets
- ARE 312, Agribusiness Marketing
- ARE 321, Agricultural Financial Management
- ARE 332, Human Resource Management for Agribusiness
- BUS 320, Financial Management
- BUS 360, Marketing Methods
- MIE 310, Introduction to Entrepreneurship
- MIE 330, Human Resource Management

### Credit Hours Required for Graduation:

87 credits common  
+34 credits for concentration

= 121 total credits

Must have met all  
requirements and have a  
GPA (grade point average) of  
2.000 or higher.

# Sample Semester-By-Semester Display for the B.S. in Animal Science

(For students who first enrolled Summer 2009 or later)

**Shown for the Science Concentration, 11SAS097**

Printed July 1, 2009

## FRESHMAN YEAR<sup>1</sup>

<u>FALL SEMESTER</u>	<u>credits</u>	<u>SPRING SEMESTER</u>	<u>credits</u>
ALS 103 Introductory Topics in Ag/Life Sci	1	CH 101 Chem – A Molecular Science <sup>2</sup>	3
ANS 150 Introduction to Animal Science <sup>2</sup>	3	CH 102 General Chemistry Lab	1
ANS 151 Intro to Animal Science Lab	1	Animal Science Course <sup>3</sup>	3
BIO 181 Intro Bio: Ecol, Evol, Biodiv & Lab	4	MA 121 Elements of Calculus <u>or</u>	
ENG 101 Acad Writing & Research <sup>2</sup>	4	MA 131 Calc for Life & Mgt Sci A	3
MA 107 Precalculus I <sup>2</sup>	3	BIO 183 Intro Bio: Cell & Molec Biol & Lab	4
	<i>Total: 16</i>		<i>Total: 14</i>

## SOPHOMORE YEAR<sup>1</sup>

<u>FALL SEMESTER</u>	<u>credits</u>	<u>SPRING SEMESTER</u>	<u>credits</u>
ANS 205 Physiol Domestic Animals	3	ANS 220 Repro & Lactation Domestic Animals	3
ANS 206 Anatomy Domestic Animals	1	ANS 221 Repro & Lact Domestic Anim Lab	1
ANS 215 Basic Agric Genetics <u>or</u>		CH 223 Organic Chem II	3
CALS Group A, B, or C elective <sup>4,5</sup>	3	CH 224 Organic Chem II Lab	1
ARE 201, EC 201, or EC 205 <sup>D</sup>	3	ST 311 Intro to Statistics	3
CH 221 Organic Chemistry I	3	Humanities GEP course <sup>C</sup>	3
CH 222 Organic Chem I Lab	1	Physical Education/Healthy Living <sup>E</sup>	1
COM 110, COM 112, or COM 211 <sup>6</sup>	3		
	<i>Total: 17</i>		<i>Total: 15</i>

## JUNIOR YEAR<sup>1</sup>

<u>FALL SEMESTER</u>	<u>credits</u>	<u>SPRING SEMESTER</u>	<u>credits</u>
ANS 230 Nutrition of Domestic Animals	3	GN 311 Principles of Genetics <u>or</u>	
ANS 231 Nutrition of Domestic Animals Lab	1	CALS Group A, B, or C elective <sup>4,5</sup>	4
CH 201 Chemistry – A Quant Sci	3	PY 212 College Physics II & Lab	4
CH 202 Quantitative Chem Lab	1	Physical Education/Healthy Living <sup>E</sup>	1
MB 351 General Microbiology	3	Humanities GEP course <sup>C</sup>	3
MB 352 Microbiology Lab	1	ANS Animal Management Elective <sup>7</sup>	3
PY 211 College Physics I & Lab	4		
	<i>Total: 16</i>		<i>Total: 15</i>

## SENIOR YEAR<sup>1</sup>

<u>FALL SEMESTER</u>	<u>credits</u>	<u>SPRING SEMESTER</u>	<u>credits</u>
ANS Discipline Course Elective <sup>8</sup>	3	ANS Discipline Course Elective <sup>8</sup>	3
Social Science GEP Course <sup>D</sup>	3	Animal Science Course <sup>3</sup>	2
Interdisciplinary Perspectives GEP Courses <sup>G</sup>	5	Additional Breadth GEP Course <sup>F</sup>	3
Free Elective <sup>9</sup>	3	Free Elective <sup>9</sup>	6
	<i>Total: 14</i>		<i>Total: 14</i>

Minimum Credit Hours Required for Graduation\* : 121

### Major/Program Footnotes:

1. Use of animals and animal specimens is critical to our educational program. To obtain full credit for Animal Science courses, students are required to participate in laboratory procedures involving animals and animal specimens. All activities with live animals are IACUC (Institutional Animal Care and Use Committee) approved. Many lectures also incorporate animals or animal specimens into the course.

2. ANS 150, MA 107, ENG 101, and CH 101 must be completed with a grade of C-minus or higher, and the student should repeat the course in the semester following the initial attempt if less than a C-minus is earned.
3. VMP 420 or any Animal Science (ANS) course (except ANS 225, ANS 301, ANS 480, ANS 492, ANS 493) that is not fulfilling another requirement can fulfill this Animal Science Elective category.
4. Students who are planning to apply to a College of Veterinary Medicine should take BCH 451 (Principles of Biochemistry) and a business course (BUS, ARE, EC, or ACC prefix) to fill the A,B,C elective category. Many graduate schools also require Biochemistry. Other students: take any courses from the College of Agriculture and Life Sciences Group A, Group B, or Group C electives ( <http://harvest.cals.ncsu.edu/index.cfm?showpage=25> ).
5. Students are required to take ANS 215 (Basic Ag Genetics) or GN 311 (Principles of Genetics - formerly numbered GN 411). Students who choose to take both should take ANS 215 before GN 311. For students who choose to take both, ANS 215 will count as an Animal Science departmental elective or a CALS group A elective. Pre-vet students: GN 311 is a vet-school required course.
6. Pre-vet students: this course also meets a vet school requirement.
7. Students must select at least one animal management course from the following list: ANS 400, Companion Animal Management; ANS 402, Beef Cattle Mgt; ANS 403, Swine Management; ANS 404, Dairy Cattle Management; ANS 408, Small Ruminant Management; ANS 410, Equine Management; or ANS 411, Management of Growing and Performance Horses.
8. Total of 6 credit hours is required from the following approved Animal Science Discipline Courses (each course = 3 credit hours): ANS(NTR, PO) 415, Comparative Nutrition; ANS(NTR) 419, Human Nutrition in Health and Disease; ANS 440, Selection of Domestic Animals; ANS 452, Advanced Reproductive Physiology and Biotechnology; ANS 453, Growth & Development of Domestic Animals; ANS 454, Lactation, Milk, and Nutrition; VMP 420, Diseases of Farm Animals; or any 500-level ANS course.
9. Students are encouraged to take an Ethics course as part of their Humanities, Additional Breadth, Interdisciplinary Perspectives, or Free Electives.

**\*General Education Program (GEP) requirements and GEP Footnotes:**

To complete the requirements for graduation and the General Education Program, the following category credit hours and co-requisites must be satisfied.

University approved GEP course lists for each of the following categories can be found at

<http://www.ncsu.edu/uap/academic-standards/gep/courselists/index.html>.

- A. **Mathematical Sciences** (6 credit hours – one course with MA or ST prefix): **Major requirements fulfill this requirement**
  - B. **Natural Sciences** (7 credit hours – include one laboratory course or course with a lab): **Major requirements fulfill this requirement**
  - C. **Humanities** (6 credit hours selected from two different disciplines/course prefixes)  
*Choose from the University approved GEP Humanities course list or the following course(s) if completed as part of the Major requirements may fulfill part of this requirement: **COM 211***
  - D. **Social Sciences** (6 credit hours selected from two different disciplines/course prefixes)  
*Choose from the University approved GEP Social Sciences course list or the following course(s) if completed as part of the Major requirements may fulfill part of this requirement: **Economics (ARE 201 or EC 201 or EC 205) taken as part of the major requirements satisfies 3 credit hours of the 6 credit hours needed to fulfill the GEP Social Sciences requirement. Students must select the other course (3 credits) from a discipline other than economics from the approved GEP Social Sciences list.***
  - E. **Physical Education/Healthy Living** (2 credit hours – at least one 100-level Fitness and Wellness Course)  
*Choose from the University approved GEP Physical Education/Healthy Living course list.*
  - F. **Additional Breadth** - (3 credit hours to be selected from the following checked University approved GEP course lists)  
**U**Humanities/Social Sciences/Visual and Performing Arts
  - G. **Interdisciplinary Perspectives** (5-6 credit hours)  
*Choose from the University approved GEP Interdisciplinary Perspectives course list*
  - H. **Introduction to Writing** (4 credit hours satisfied by completing ENG 101 with a C- or better )
- The following **Co-Requisites** must be satisfied to complete the General Education Program requirements:
- I. **U.S. Diversity** (USD)  
*Choose from the University approved GEP U.S. Diversity course list or choose a course identified on the approved GEP course lists as meeting the U.S. Diversity (USD) co-requisite.*
  - J. **Global Knowledge** (GK)  
*Choose from the University approved GEP Global Knowledge course list or choose a course identified on the approved GEP course lists as meeting the Global Knowledge (GK) co-requisite.*
  - K. **Foreign Language proficiency** - Proficiency at the FL\_102 level is required for graduation.