

# Animal Science

## Animal Science Major

The Animal Science major encompasses physiology, nutrition, genetics, reproduction, marketing, management, and husbandry of livestock and companion animals; the important scientific understanding for the utilization of animal products; and experiences necessary for leadership in, and advocacy for, industries that provide animals and animal products that benefit humans.

## Curriculum Options

Five study options are available for the animal science major.

- **Animal Production, Management and Husbandry:** This option is designed for students desiring a background in the principles of animal management and husbandry. It includes broad training in animal husbandry, production and management. Employment opportunities include careers in livestock production, allied support fields, and in technical support fields including agricultural positions within the Cooperative Extension Service.
- **Animal Biomedical Science:** This option offers students a more scientific approach to animal science, preparing them for veterinary medicine, graduate research in animal science, teaching, food technology and the biotechnology industry. Students may receive an animal science degree while meeting academic requirements for application to veterinary schools.
- **Animal Agribusiness:** This option is designed for students desiring a background in the business and economic principles as they apply to the livestock industry. It leads to broad training in animal husbandry, production, business, and management. Employment opportunities include careers in agribusiness, sales and marketing of livestock and products for the livestock industry, and a variety of public and private institutions which serve the business of animal agriculture.
- **Livestock Media:** This option offers students an opportunity to acquire skills in journalism, advertising, and public relations in addition to the fundamentals of animal science. Employment opportunities include working for a variety of media outlets including print and virtual media, TV, radio, magazines, breed associations, or commodity organizations as well as positions involved in public relations in the livestock industry.
- **Meat Science:** This option provides the opportunity to emphasize knowledge about the science of muscle biology and evaluation and processing of red meat. This option prepares students for a broad variety of career opportunities in the meat industry including management, sales, meat inspection, and meat marketing.

## Animal Science Minor

Students from other majors may minor in Animal Science by completing a minimum of 16 credits. A minimum of eight credits must be completed at NDSU.

## Major Requirements

### Major: Animal Science

Degree Type: B.S.

Minimum Degree Credits to Graduate: 128

### General Education Requirements for Baccalaureate Degree

- A list of approved general education courses is available here (<http://bulletin.ndsu.edu/past-bulletin-archive/2017-18/academic-policies/undergraduate-policies/general-education/#genedcoursestext>).
- General education courses may be used to satisfy requirements for both general education and the major, minor, and program emphases, where applicable. Students should carefully review the major, minor, and program emphases requirements for minimum grade restrictions, should they apply.

| Code   | Title                           | Credits |
|--|---------------------------------|---------|
| <b>Communication (C)</b>                               |                                 | 12      |
| ENGL 110   | College Composition I           |         |
| ENGL 120   | College Composition II          |         |
| COMM 110   | Fundamentals of Public Speaking |         |
| Upper Division Writing <sup>†</sup>                    |                                 |         |
| <b>Quantitative Reasoning (R) <sup>†</sup></b>         |                                 | 3       |
| <b>Science and Technology (S) <sup>†</sup></b>         |                                 | 10      |
| <b>Humanities and Fine Arts (A) <sup>†</sup></b>       |                                 | 6       |
| <b>Social and Behavioral Sciences (B) <sup>†</sup></b> |                                 | 6       |
| <b>Wellness (W) <sup>†</sup></b>                       |                                 | 2       |

**Cultural Diversity (D) <sup>\*†</sup>****Global Perspectives (G) <sup>\*†</sup>**

|               |    |
|---------------|----|
| Total Credits | 39 |
|---------------|----|

\* May be satisfied by completing courses in another General Education category.

† May be satisfied with courses required in the major. Review major requirements to determine if a specific upper division writing course is required.

**Major Requirements**

| Code   | Title   | Credits |
|--|---|---------|
| <b>Required Core Courses for Animal Science</b>  |   |         |
| AGRI 189   | Skills for Academic Success <sup>1</sup>                                      | 1       |
| ANSC 114   | Introduction to Animal Sciences   | 3       |
| ECON 201   | Principles of Microeconomics (May satisfy general education category B and G) | 3       |
| MATH 103   | College Algebra   | 3       |
| or MATH 105  | Trigonometry  |         |
| or MATH 107  | Precalculus   |         |
| or MATH 146  | Applied Calculus I  |         |
| STAT 330   | Introductory Statistics (May satisfy general education category R)            | 3       |
| VETS 135   | Anatomy and Physiology of Domestic Animals                                    | 3       |
| Select one of the following (Not required for students transferring in 24 or more credits):  |   | 1       |
| AGRI 150   | Agriculture Orientation   |         |
| ANSC 150   | Animal Science Orientation  |         |
| VETS 150   | Introduction to the Veterinary Profession                                     |         |
| ANSC 240   | Meat Animal Evaluation and Marketing  | 3       |
| ANSC 300   | Domestic Animal Behavior and Management                                       | 3       |
| ANSC 323   | Fundamentals of Nutrition   | 3       |
| ANSC 324   | Applied Animal Nutrition  | 3       |
| ANSC 463<br>& 463L   | Physiology of Reproduction<br>and Physiology of Reproduction Laboratory       | 4       |
| ANSC 478   | Research and Issues in Animal Agriculture                                     | 3       |
| Select one of the following:   |   | 2       |
| ANSC 393   | Undergraduate Research (research experience)                                  |         |
| ANSC 396   | Field Experience (internship experience)                                      |         |
| Select one of the following:   |   | 3       |
| ANSC 480   | Equine Industry and Production Systems  |         |
| ANSC 482   | Sheep Industry and Production Systems   |         |
| ANSC 484   | Swine Production/Pork Industry Systems  |         |
| ANSC 486   | Beef Industry and Production Systems  |         |
| ANSC 488   | Dairy Industry and Production Systems   |         |
| <b>Options: Select one of the five options listed below.</b>   |   | 46-50   |
| Students must select one option of interest. The standard option for this major is the Animal Production, Management and Husbandry. Students who wish to declare an option other than the standard option must officially declare that option with the Office of Registration and Records. |   |         |

|               |       |
|---------------|-------|
| Total Credits | 87-91 |
|---------------|-------|

<sup>1</sup> AGRI189 is only required for first-time, first-year students—A first-time, first-year student is defined as a student who has not yet completed a college course as a college student. Students that are not first-time, first-year students that either transfer into the university or change their major are not required to take AGRI 189.

**Option 1: Animal Production, Management, & Husbandry Option**

| Code     | Title                                   | Credits |
|----------|---|---------|
| AGEC 242 | Introduction to Agricultural Management | 3       |
| AGEC 244 | Agricultural Marketing                  | 3       |

|  |   |   |
|--|---|---|
| BIOC 260                                     | Elements of Biochemistry  | 4 |
| MICR 202<br>& 202L                           | Introductory Microbiology<br>and Introductory Microbiology Lab (May satisfy general education category S)               | 3 |
| PLSC 110                                     | World Food Crops (May satisfy general education category S)   | 3 |
| PLSC 315                                     | Genetics (May satisfy general education category S)   | 3 |
| Select one from the following:               |   | 4 |
| BIOL 111<br>& 111L                           | Concepts of Biology<br>and Concepts of Biology Lab (May satisfy general education category S)                           |   |
| BIOL 150<br>& 150L                           | General Biology I<br>and General Biology I Laboratory   |   |
| Select one from the following:               |   | 4 |
| CHEM 117<br>& 117L                           | Chemical Concepts and Applications<br>and Chem Concepts and Applications Lab (May satisfy general education category S) |   |
| CHEM 121<br>& 121L                           | General Chemistry I<br>and General Chemistry I Laboratory (May satisfy general education category S)                    |   |
| Select one the following evaluation courses: |   | 2 |
| ANSC 230                                     | Meat Grading and Evaluation   |   |
| ANSC 231                                     | Livestock Evaluation  |   |
| ANSC 232                                     | Dairy Cattle Evaluation   |   |
| ANSC 235                                     | Equine Evaluation   |   |
| ANSC 340                                     | Principles of Meat Science  | 3 |
| ANSC 357                                     | Animal Genetics   | 3 |
| ANSC 370                                     | Fundamentals/Animal Disease   | 3 |
| ANSC 380                                     | Livestock Sales and Marketing   | 2 |
| ANSC 480                                     | Equine Industry and Production Systems  | 3 |
| or ANSC 482                                  | Sheep Industry and Production Systems   |   |
| or ANSC 484                                  | Swine Production/Pork Industry Systems  |   |
| or ANSC 486                                  | Beef Industry and Production Systems  |   |
| or ANSC 488                                  | Dairy Industry and Production Systems   |   |
| PLSC 320                                     | Principles of Forage Production   | 3 |
| or RNG 136                                   | Introduction to Range Management  |   |

Total Credits 46

### Option 2: Animal Agribusiness Option

| Code  | Title   | Credits |
|---|---|---------|
| ACCT 102  | Fundamentals of Accounting  | 3       |
| AGEC 242  | Introduction to Agricultural Management   | 3       |
| AGEC 244  | Agricultural Marketing  | 3       |
| AGEC 246  | Introduction to Agricultural Finance  | 3       |
| Select one from the following:                  |   | 4       |
| BIOL 111<br>& 111L                              | Concepts of Biology<br>and Concepts of Biology Lab (May satisfy general education category S)                           |         |
| BIOL 150<br>& 150L                              | General Biology I<br>and General Biology I Laboratory   |         |
| Select one from the following:                  |   | 4       |
| CHEM 117<br>& 117L                              | Chemical Concepts and Applications<br>and Chem Concepts and Applications Lab (May satisfy general education category S) |         |
| CHEM 121<br>& 121L                              | General Chemistry I<br>and General Chemistry I Laboratory (May satisfy general education category S)                    |         |
| Select one of the following evaluation courses: |   | 2       |
| ANSC 230  | Meat Grading and Evaluation   |         |
| ANSC 231  | Livestock Evaluation  |         |
| ANSC 232  | Dairy Cattle Evaluation   |         |
| ANSC 235  | Equine Evaluation   |         |

|   |   |    |
|---|---|----|
| ANSC 357  | Animal Genetics   | 3  |
| ANSC 380  | Livestock Sales and Marketing   | 2  |
| ECON 202  | Principles of Macroeconomics (May satisfy general education category B) | 3  |
| PLSC 315  | Genetics (May satisfy general education category S)                     | 3  |
| AGEC elective   | 300-400 level   | 6  |
| Animal Agribusiness electives - 9 Credits (Students may choose from upper level ANSC, AGECE, ECON, PLSC or RNG) |   | 9  |
| Total Credits   |   | 48 |

### Option 3: Biomedical Science Option

Students interested in veterinary school should consider this option. The option meets most veterinary school prerequisites. Consultation with an adviser is recommended.

| Code  | Title  | Credits |
|---|--|---------|
| ANSC 357<br>or ANSC 314   | Animal Genetics<br>Animal Biotechnology  | 3       |
| ANSC 444  | Livestock Muscle Physiology  | 3       |
| BIOC 260  | Elements of Biochemistry   | 4       |
| BIOL 150<br>& 150L  | General Biology I<br>and General Biology I Laboratory  | 4       |
| BIOL 151<br>& 151L  | General Biology II<br>and General Biology II Laboratory  | 4       |
| CHEM 121<br>& 121L  | General Chemistry I<br>and General Chemistry I Laboratory (May satisfy general education category S)         | 4       |
| CHEM 122<br>& 122L  | General Chemistry II<br>and General Chemistry II Laboratory (May satisfy general education category S)       | 4       |
| CHEM 240<br>or CHEM 341   | Survey of Organic Chemistry<br>Organic Chemistry I   | 3       |
| MICR 350<br>& 350L  | General Microbiology<br>and General Microbiology Lab   | 5       |
| PLSC 315  | Genetics (May satisfy general education category S)  | 3       |
| Select one of the following evaluation courses:   |  | 2       |
| ANSC 230  | Meat Grading and Evaluation  |         |
| ANSC 231  | Livestock Evaluation   |         |
| ANSC 232  | Dairy Cattle Evaluation  |         |
| ANSC 235  | Equine Evaluation  |         |
| Select one from the following:  |  | 4       |
| PHYS 120<br>& 120L  | Fundamentals of Physics<br>and Fundamentals of Physics Laboratory (May satisfy general education category S) |         |
| PHYS 211<br>& 211L  | College Physics I<br>and College Physics I Laboratory (May satisfy general education category S)             |         |
| Biomedical Science electives – 8 Credits (Students may choose from upper level ANSC, BIOC, BIOL, CHEM, MICR, PHYS OR ZOO) |  | 8       |
| Total Credits   |  | 51      |

### Option 4: Livestock Media Option

| Code  | Title   | Credits |
|---|---|---------|
| AGEC 242  | Introduction to Agricultural Management             | 3       |
| AGEC 244  | Agricultural Marketing                              | 3       |
| ANSC 357  | Animal Genetics                                     | 3       |
| ANSC 380  | Livestock Sales and Marketing                       | 2       |
| PLSC 315  | Genetics (May satisfy general education category S) | 3       |
| Select one of the following evaluation courses: |   | 2       |
| ANSC 230  | Meat Grading and Evaluation                         |         |
| ANSC 231  | Livestock Evaluation                                |         |
| ANSC 232  | Dairy Cattle Evaluation                             |         |

|   |   |    |
|---|---|----|
| ANSC 235  | Equine Evaluation   |    |
| Select one from the following:  |   | 4  |
| BIOL 111<br>& 111L  | Concepts of Biology<br>and Concepts of Biology Lab (May satisfy general education category S)                           |    |
| BIOL 150<br>& 150L  | General Biology I<br>and General Biology I Laboratory (May satisfy general education category S)                        |    |
| Select one from the following:  |   | 4  |
| CHEM 117<br>& 117L  | Chemical Concepts and Applications<br>and Chem Concepts and Applications Lab (May satisfy general education category S) |    |
| CHEM 121<br>& 121L  | General Chemistry I<br>and General Chemistry I Laboratory (May satisfy general education category S)                    |    |
| <b>Complete any minor in the communication area (Agric Comm; Health Comm; Journalism; Mgmt Comm; New Media &amp; Web Design; or Strategic Comm)</b> |   | 21 |
| Total Credits   |   | 45 |

### Option 5: Meat Science Option

| Code  | Title   | Credits |
|---|---|---------|
| AGEC 244  | Agricultural Marketing  | 3       |
| ANSC 230  | Meat Grading and Evaluation   | 2       |
| ANSC 340  | Principles of Meat Science  | 3       |
| ANSC 344  | Fundamentals of Meat Processing   | 2       |
| ANSC 357  | Animal Genetics   | 3       |
| ANSC 444  | Livestock Muscle Physiology   | 3       |
| BIOC 260  | Elements of Biochemistry  | 4       |
| CFS 210   | Introduction to Food Science and Technology   | 2       |
| MICR 202<br>& 202L  | Introductory Microbiology<br>and Introductory Microbiology Lab (May satisfy general education category S)               | 3       |
| PLSC 315  | Genetics (May satisfy general education category S)   | 3       |
| CFS elective  | 300-400 Level   | 3       |
| Meat Science electives – 8 Credits (Students may choose from upper level ANSC, BIOC, CFS, CHEM, MICR OR SAFE) |   | 8       |
| Select one from the following:  |   | 4       |
| BIOL 111<br>& 111L  | Concepts of Biology<br>and Concepts of Biology Lab (May satisfy general education category S)                           |         |
| BIOL 150<br>& 150L  | General Biology I<br>and General Biology I Laboratory   |         |
| Select from the following:  |   | 4       |
| CHEM 117<br>& 117L  | Chemical Concepts and Applications<br>and Chem Concepts and Applications Lab (May satisfy general education category S) |         |
| CHEM 121<br>& 121L  | General Chemistry I<br>and General Chemistry I Laboratory (May satisfy general education category S)                    |         |
| Total Credits   |   | 47      |

### Degree Requirements and Notes:

- Students must earn a minimum 2.00 cumulative GPA for courses that satisfy major requirements.
- Transfer grades must be 'C' or higher to count toward major requirements.

## Minor Requirements

### Animal Science Minor

#### Minor Requirements

Required Credits: 16

| Code                    | Title                           | Credits |
|-------------------------|---------------------------------|---------|
| <b>Required Courses</b> |                                 |         |
| ANSC 114                | Introduction to Animal Sciences | 3       |

|                         |                                      |          |
|-------------------------|--------------------------------------|----------|
| ANSC 223                | Introduction to Animal Nutrition     | 2        |
| ANSC 220                | Livestock Production                 | 3        |
| ANSC 240                | Meat Animal Evaluation and Marketing | 3        |
| <b>Elective Courses</b> |                                      | <b>5</b> |

Must include one of the following courses:

|          |   |
|----------|---|
| ANSC 300 | Domestic Animal Behavior and Management |
| ANSC 314 | Animal Biotechnology                    |
| ANSC 323 | Fundamentals of Nutrition               |
| ANSC 324 | Applied Animal Nutrition                |
| ANSC 340 | Principles of Meat Science              |
| ANSC 344 | Fundamentals of Meat Processing         |
| ANSC 357 | Animal Genetics                         |
| ANSC 370 | Fundamentals/Animal Disease             |
| ANSC 380 | Livestock Sales and Marketing           |
| ANSC 426 | Feed Technology                         |
| ANSC 444 | Livestock Muscle Physiology             |
| ANSC 463 | Physiology of Reproduction              |
| ANSC 487 | Growing and Finishing Cattle Management |

Remaining credits may come from those listed above or the following courses:

|          |                             |
|----------|-----------------------------|
| ANSC 230 | Meat Grading and Evaluation |
| ANSC 231 | Livestock Evaluation        |
| ANSC 232 | Dairy Cattle Evaluation     |

Total Credits 16

#### Minor Requirements and Notes:

- A minimum of 8 credits must be taken at NDSU.
- Students must earn a minimum 2.00 GPA for the minor requirements.

## Plan of Study

This Plan of Study applies to Animal Production, Management, and Husbandry study option (Option 1). For other options see the departmental website.

| <b>Freshman</b>                 |                |  |                |
|---------------------------------|----------------|--|----------------|
| <b>Fall</b>                     | <b>Credits</b> | <b>Spring</b>                                    | <b>Credits</b> |
| ANSC 114                        | 3              | ANSC 240   | 3              |
| ANSC 150, VETS 150, or AGRI 150 | 1              | BIOL 111 or 150                                  | 3              |
| AGRI 189                        | 1              | BIOL 111L or 150L                                | 1              |
| VETS 135                        | 3              | ENGL 120 (ENGL 110 or placement as prerequisite) | 3              |
| MATH 103                        | 3              | PLSC 110   | 3              |
| CHEM 117 or 121                 | 3              | Hum/FA & Cult Div                                | 3              |
| CHEM 117L or 121L               | 1              |  |                |
|                                 | 15             |  | 16             |
| <b>Sophomore</b>                |                |  |                |
| <b>Fall</b>                     | <b>Credits</b> | <b>Spring</b>                                    | <b>Credits</b> |
| AGEC 242                        | 3              | AGEC 244   | 3              |
| ANSC 231                        | 2              | BIOC 260   | 4              |
| MICR 202 & 202L                 | 3              | STAT 330   | 3              |
| COMM 110                        | 3              | PLSC 315   | 3              |

ECON 201<sup>1</sup> Social Science and Global Perspective course 3 Humanities or Fine Art 3

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**Junior**

| Fall                | Credits | Spring    | Credits |
|---------------------|---------|-----------|---------|
| ANSC 300            | 3       | ANSC 324  | 3       |
| ANSC 323            | 3       | ANSC 340  | 3       |
| ANSC 370            | 3       | ANSC 357  | 3       |
| RNG 136 or PLSC 320 | 3       | ANSC 380  | 2       |
| ENGL 320            | 3       | ANSC 463  | 3       |
| Wellness            | 2       | ANSC 463L | 1       |

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**Senior**

| Fall                                | Credits | Spring                              | Credits |
|-------------------------------------|---------|-------------------------------------|---------|
| ANSC 393 or 396                     | 1-5     | ANSC 480, 484, or 486               | 3       |
| ANSC 482 or 488                     | 3       | ANSC 478                            | 3       |
| Social or Behavioral Sci            | 3       | Elective <sup>Some are guided</sup> | 10      |
| Elective <sup>Some are guided</sup> | 12      |                                     |         |

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Total Credits: 128-132