

ANIMAL SCIENCE (ANSC)

Department of Animal Biosciences, Ontario Agricultural College

The animal science curriculum is designed to provide a broad opportunity to study animal physiology, nutrition, genetics, behaviour and welfare across a range of large and small domestic animal species. The program is designed around an option to follow a Production and Management focus or a Research focus in semesters 5-8 with additional flexibility to allow for a semester of study abroad.

The Co-op program in Animal Science facilitates the transition of students from academic studies to a professional career by enhancing the integration of theory and practice.

Major Requirements (Honours)

This is a major within the degree: Bachelor of Science in Agriculture.

| Code | Title | Credits |
|--------------------------------------|---|---------|
| Semester 1 | | |
| AGR*1110 | Introduction to the Agri-Food Systems | 1.00 |
| BIOL*1050 | Biology of Plants & Animals in Managed Ecosystems | 0.50 |
| CHEM*1040 | General Chemistry I | 0.50 |
| MATH*1080 | Elements of Calculus I | 0.50 |
| Semester 2 | | |
| AGR*1350 | Animal Production Systems and Industry: Dairy, Poultry and Egg | 0.50 |
| BIOL*1090 | Introduction to Molecular and Cellular Biology | 0.50 |
| CHEM*1050 | General Chemistry II | 0.50 |
| FARE*1400 | Economics of the Agri-Food System | 1.00 |
| Semester 3 | | |
| AGR*2320 | Soils in Agroecosystems | 0.50 |
| AGR*2350 | Animal Production Systems and Industry: Beef, Swine and Others | 0.50 |
| AGR*2470 | Introduction to Plant Agriculture | 0.50 |
| MBG*2400 | Fundamentals of Plant and Animal Genetics | 0.50 |
| FARE*2700 or MBG*2040 | Survey of Natural Resource Economics Foundations in Molecular Biology and Genetics | 0.50 |
| Semester 4 | | |
| AGR*2050 | Agroecology | 0.50 |
| ANSC*2210 | Principles of Animal Care and Welfare | 0.50 |
| ANSC*2340 | Structure of Farm Animals | 0.50 |
| BIOC*2580 | Introduction to Biochemistry | 0.50 |
| STAT*2040 | Statistics I | 0.50 |
| Semester 5 to 8 | | |
| Select one of the following options: | | 10.00 |
| Option A - Production and Management | | |
| Option B - Research | | |

Option A - Production and Management

| Code | Title | Credits |
|--|---|---------|
| Semester 5 | | |
| ANSC*3080 | Agricultural Animal Physiology | 0.50 |
| ANSC*3120 | Introduction to Animal Nutrition | 0.50 |
| NUTR*3210 | Fundamentals of Nutrition | 0.50 |
| 1.00 electives or restricted electives | | 1.00 |
| Semester 6 | | |
| ANSC*3040 | Animal Reproduction | 0.50 |
| ANSC*3270 | Animal Disorders | 0.50 |
| MBG*3060 | Quantitative Genetics | 0.50 |
| 1.00 electives or restricted electives | | 1.00 |
| Semester 7 | | |
| 2.50 electives or restricted electives | | 2.50 |
| Semester 8 | | |
| AGR*4600 | Agriculture and Food Issues Problem Solving | 1.00 |
| 1.50 electives or restricted electives | | 1.50 |

Restricted Electives - Option A

Students should note that some restricted electives require other courses not included among the required courses for the major as prerequisites. Students should consult the most recent undergraduate calendar for specific requirements.

- A minimum of 1.00 credits from the list:

| Code | Title | Credits |
|-----------|---|---------|
| AGR*2500 | Field Course in International Agriculture | 0.50 |
| AGR*3010 | Special Studies in Agricultural Science I | 0.50 |
| AGR*3450 | Research Methods in Agricultural Science | 0.50 |
| ANSC*4010 | Animal Welfare Judging and Evaluation | 0.50 |
| ANSC*4230 | Challenges and Opportunities in Dairy Cattle Production | 0.50 |
| ANSC*4610 | Critical Analysis in Animal Science | 0.50 |
| CROP*4260 | Crop Science Field Trip | 0.50 |
| EDRD*3140 | Organizational Communication | 0.50 |
| FARE*3310 | Operations Management | 0.50 |
| FARE*4220 | Advanced Agribusiness Management | 0.50 |
| FARE*4310 | Resource Economics | 0.50 |
| FARE*4360 | Marketing Research | 0.50 |
| FARE*4550 | Independent Studies I | 0.50 |
| IAEF*3500 | Experiential Education | 0.50 |
| IAEF*3510 | Interdisciplinary Flexible Internship | 0.50 |

- A minimum of 3.00 credits is required from the following lists:

| Code | Title | Credits |
|--|--|---------|
| Select a minimum of 0.50 credits from the following: | | |
| ANSC*4050 | Biotechnology in Animal Science | 0.50 |
| MBG*4020 | Genetics of Companion Animals | 0.50 |
| MBG*4030 | Animal Breeding Methods and Applications | 0.50 |

Select a minimum of 1.00 credits from the following:

| | | |
|-----------|---------------------------------|------|
| ANSC*3170 | Nutrition of Fish and Crustacea | 0.50 |
| ANSC*3180 | Wildlife Nutrition | 0.50 |

| | | |
|--|---|------|
| ANSC*4260 | Beef Cattle Nutrition | 0.50 |
| ANSC*4270 | Dairy Cattle Nutrition | 0.50 |
| ANSC*4280 | Poultry Nutrition | 0.50 |
| ANSC*4290 | Swine Nutrition | 0.50 |
| ANSC*4470 | Animal Metabolism | 0.50 |
| ANSC*4560 | Pet Nutrition | 0.50 |
| EQN*4020 | Advanced Equine Nutrition | 0.50 |
| Select a minimum of 1.00 credits from the following: | | |
| AGR*3200 | Computing for Bioscientists | 0.50 |
| ANSC*3050 | Aquaculture: Advanced Issues | 0.50 |
| ANSC*3090 | Principles of Animal Behaviour | 0.50 |
| ANSC*4040 | Digital Technologies for Animal Production Systems | 0.50 |
| ANSC*4090 | Applied Animal Behaviour and Welfare | 0.50 |
| ANSC*4100 | Applied Environmental Physiology and Animal Housing | 0.50 |
| ANSC*4490 | Applied Endocrinology | 0.50 |
| ANSC*4650 | Comparative Immunology | 0.50 |
| EQN*3250 | Equine Exercise Physiology | 0.50 |

- A minimum of 7.00 credits must be at the 3000 level or higher, of which 5.00 credits must be in agricultural science and of which 3.50 credits must be at the 4000 level. Refer to Program Counsellor for list of agricultural science courses.
- A humanities or social science courses (0.50 credits) at the 1000-level or above. See Program Counsellor for acceptable list of courses.

Option B - Research

| Code | Title | Credits |
|--|--|---------|
| Semester 5 | | |
| AGR*3450 | Research Methods in Agricultural Science | 0.50 |
| ANSC*3080 | Agricultural Animal Physiology | 0.50 |
| ANSC*3120 | Introduction to Animal Nutrition | 0.50 |
| NUTR*3210 | Fundamentals of Nutrition | 0.50 |
| 0.50 electives or restricted electives | | 0.50 |
| Semester 6 | | |
| ANSC*3040 | Animal Reproduction | 0.50 |
| ANSC*3270 | Animal Disorders | 0.50 |
| MBG*3060 | Quantitative Genetics | 0.50 |
| 1.00 electives or restricted electives | | 1.00 |
| Semester 7 | | |
| 2.50 electives or restricted electives | | 2.50 |
| Semester 8 | | |
| 2.50 electives or restricted electives | | 2.50 |

Restricted Electives - Option B

Students should note that some restricted electives require other courses not included among the required courses for the major as prerequisites. Students should consult the most recent undergraduate calendar for specific requirements.

- A minimum of 1.00 credits from the following list (normally to be taken during semesters 7 and 8):

| Code | Title | Credits |
|-----------|-------------------------------------|---------|
| ANSC*4350 | Experiments in Animal Biology | 0.50 |
| ANSC*4610 | Critical Analysis in Animal Science | 0.50 |

| | | |
|-----------|-------------------------------|------|
| ANSC*4700 | Research in Animal Biology I | 0.50 |
| ANSC*4710 | Research in Animal Biology II | 0.50 |

- A minimum of 3.00 credits is required from the following lists:

| Code | Title | Credits |
|--|--|---------|
| Select a minimum of 0.50 credits from the following: | | |
| ANSC*4050 | Biotechnology in Animal Science | 0.50 |
| MBG*4020 | Genetics of Companion Animals | 0.50 |
| MBG*4030 | Animal Breeding Methods and Applications | 0.50 |

Select a minimum of 1.00 credits from the following:

| | | |
|-----------|---------------------------------|------|
| ANSC*3170 | Nutrition of Fish and Crustacea | 0.50 |
| ANSC*3180 | Wildlife Nutrition | 0.50 |
| ANSC*4260 | Beef Cattle Nutrition | 0.50 |
| ANSC*4270 | Dairy Cattle Nutrition | 0.50 |
| ANSC*4280 | Poultry Nutrition | 0.50 |
| ANSC*4290 | Swine Nutrition | 0.50 |
| ANSC*4470 | Animal Metabolism | 0.50 |
| ANSC*4560 | Pet Nutrition | 0.50 |
| EQN*4020 | Advanced Equine Nutrition | 0.50 |

Select a minimum of 1.00 credits from the following:

| | | |
|-----------|---|------|
| AGR*3200 | Computing for Bioscientists | 0.50 |
| ANSC*3050 | Aquaculture: Advanced Issues | 0.50 |
| ANSC*3090 | Principles of Animal Behaviour | 0.50 |
| ANSC*4040 | Digital Technologies for Animal Production Systems | 0.50 |
| ANSC*4090 | Applied Animal Behaviour and Welfare | 0.50 |
| ANSC*4100 | Applied Environmental Physiology and Animal Housing | 0.50 |
| ANSC*4490 | Applied Endocrinology | 0.50 |
| ANSC*4650 | Comparative Immunology | 0.50 |
| EQN*3250 | Equine Exercise Physiology | 0.50 |

- A minimum of 7.00 credits must be at the 3000 level or higher, of which 5.00 credits must be in agricultural science and of which 3.50 credits must be at the 4000 level. Refer to Program Counsellor for list of agricultural science courses.
- A humanities or social science courses (0.50 credits) at the 1000-level or above from the College of Arts or College of Social and Applied Human Sciences. See Program Counsellor for acceptable list of courses.

Co-op Requirements (Honours)

This is a major within the degree: Bachelor of Science in Agriculture.

Academic and Co-op Work Term Schedule

| Year | Fall | Winter | Summer |
|------|----------------------------------|------------------------|------------------------|
| 1 | Academic Semester 1 | Academic Semester 2 | Off |
| 2 | Academic Semester 3 COOP*1100 | Academic Semester 4 | COOP*1000 Work Term I |
| 3 | Academic Semester 5 | Academic Semester 6 | COOP*2000 Work Term II |
| 4 | COOP*3000 Work Term III | COOP*4000 Work Term IV | Off |

| | | | |
|---|------------------------|------------------------|-----|
| 5 | Academic Semester 7 | Academic Semester 8 | N/A |
|---|------------------------|------------------------|-----|

Please refer to the Co-operative Education program policy with respect to work term performance grading, work term report grading and program completion requirements.

For additional program information, students should consult with their Co-op Coordinator and Co-op Faculty Advisor, listed on the Co-operative Education website.

Credit Summary

- In semester 5, students must choose Option A: Production and Management or Option B: Research.
 - Option A: 14.00 credits from required courses, 4.00 credits of restricted electives and 2.00 credits of free electives.
 - Option B: 13.50 credits from required courses, 4.00 credits of restricted electives and 2.50 credits of free electives.
- A minimum of 7.50 credits must be at the 3000 level or higher, of which 5.00 credits must be in agricultural science and of which 3.50 credits must be at the 4000 level. Refer to a Program Counsellor for a list of agricultural science courses.
- A humanities or social sciences (0.50 credits) at the 1000-level or above. See Program Counsellor for a list of acceptable courses.
- Co-op Work Terms: 2.00 credits
- **Total Credits Required to Graduate: 22.00 credits**

Recommended Program Sequence

| Code | Title | Credits |
|-----------------------------------|---|---------|
| Semester 1 - Fall | | |
| AGR*1110 | Introduction to the Agri-Food Systems | 1.00 |
| BIOL*1050 | Biology of Plants & Animals in Managed Ecosystems | 0.50 |
| CHEM*1040 | General Chemistry I | 0.50 |
| MATH*1080 | Elements of Calculus I | 0.50 |
| Semester 2 - Winter | | |
| AGR*1350 | Animal Production Systems and Industry: Dairy, Poultry and Egg | 0.50 |
| BIOL*1090 | Introduction to Molecular and Cellular Biology | 0.50 |
| CHEM*1050 | General Chemistry II | 0.50 |
| FARE*1400 | Economics of the Agri-Food System | 1.00 |
| Summer Semester | | |
| No academic semester or work term | | |
| Semester 3 - Fall | | |
| AGR*2320 | Soils in Agroecosystems | 0.50 |
| AGR*2350 | Animal Production Systems and Industry: Beef, Swine and Others | 0.50 |
| AGR*2470 | Introduction to Plant Agriculture | 0.50 |
| COOP*1100 | Introduction to Co-operative Education | 0.00 |
| MBG*2400 | Fundamentals of Plant and Animal Genetics | 0.50 |
| FARE*2700 or MBG*2040 | Survey of Natural Resource Economics Foundations in Molecular Biology and Genetics | 0.50 |
| Semester 4 - Winter | | |
| AGR*2050 | Agroecology | 0.50 |
| ANSC*2210 | Principles of Animal Care and Welfare | 0.50 |

| | | |
|------------------------|------------------------------|------|
| ANSC*2340 | Structure of Farm Animals | 0.50 |
| BIOC*2580 | Introduction to Biochemistry | 0.50 |
| STAT*2040 | Statistics I | 0.50 |
| Summer Semester | | |
| COOP*1000 | Co-op Work Term I | 0.50 |

Option A - Production and Management

| Code | Title | Credits |
|--|---|---------|
| Semester 5 - Fall | | |
| ANSC*3080 | Agricultural Animal Physiology | 0.50 |
| ANSC*3120 | Introduction to Animal Nutrition | 0.50 |
| NUTR*3210 | Fundamentals of Nutrition | 0.50 |
| 1.00 electives or restricted electives | | 1.00 |
| Semester 6 - Winter | | |
| ANSC*3040 | Animal Reproduction | 0.50 |
| ANSC*3270 | Animal Disorders | 0.50 |
| MBG*3060 | Quantitative Genetics | 0.50 |
| 1.00 electives or restricted electives | | 1.00 |
| Summer Semester | | |
| COOP*2000 | Co-op Work Term II | 0.50 |
| Fall Semester | | |
| COOP*3000 | Co-op Work Term III | 0.50 |
| Winter Semester | | |
| COOP*4000 | Co-op Work Term IV | 0.50 |
| Summer Semester | | |
| No academic semester or work term | | |
| Semester 7 - Fall | | |
| 2.50 electives or restricted electives | | 2.50 |
| Semester 8 - Winter | | |
| AGR*4600 | Agriculture and Food Issues Problem Solving | 1.00 |
| 1.50 electives or restricted electives | | 1.50 |

Restricted Electives - Option A

Students should note that some restricted electives require other courses not included among the required courses for the major as prerequisites. Students should consult the most recent undergraduate calendar for specific requirements.

- A minimum of 1.00 credits from the list:

| Code | Title | Credits |
|-----------|---|---------|
| AGR*2500 | Field Course in International Agriculture | 0.50 |
| AGR*3010 | Special Studies in Agricultural Science I | 0.50 |
| AGR*3450 | Research Methods in Agricultural Science | 0.50 |
| ANSC*4010 | Animal Welfare Judging and Evaluation | 0.50 |
| ANSC*4230 | Challenges and Opportunities in Dairy Cattle Production | 0.50 |
| ANSC*4610 | Critical Analysis in Animal Science | 0.50 |
| CROP*4260 | Crop Science Field Trip | 0.50 |
| EDRD*3140 | Organizational Communication | 0.50 |
| FARE*3310 | Operations Management | 0.50 |
| FARE*4220 | Advanced Agribusiness Management | 0.50 |
| FARE*4310 | Resource Economics | 0.50 |

| | | |
|-----------|-----------------------|------|
| FARE*4360 | Marketing Research | 0.50 |
| FARE*4550 | Independent Studies I | 0.50 |

- A minimum of 3.00 credits is required from the following lists:

| Code | Title | Credits |
|------|-------|---------|
|------|-------|---------|

Select a minimum of 0.50 credits from the following:

| | | |
|-----------|--|------|
| ANSC*4050 | Biotechnology in Animal Science | 0.50 |
| MBG*4020 | Genetics of Companion Animals | 0.50 |
| MBG*4030 | Animal Breeding Methods and Applications | 0.50 |

Select a minimum of 1.00 credits from the following:

| | | |
|-----------|---------------------------------|------|
| ANSC*3170 | Nutrition of Fish and Crustacea | 0.50 |
| ANSC*3180 | Wildlife Nutrition | 0.50 |
| ANSC*4260 | Beef Cattle Nutrition | 0.50 |
| ANSC*4270 | Dairy Cattle Nutrition | 0.50 |
| ANSC*4280 | Poultry Nutrition | 0.50 |
| ANSC*4290 | Swine Nutrition | 0.50 |
| ANSC*4470 | Animal Metabolism | 0.50 |
| ANSC*4560 | Pet Nutrition | 0.50 |
| EQN*4020 | Advanced Equine Nutrition | 0.50 |

Select a minimum of 1.00 credits from the following:

| | | |
|-----------|---|------|
| AGR*3200 | Computing for Bioscientists | 0.50 |
| ANSC*3050 | Aquaculture: Advanced Issues | 0.50 |
| ANSC*3090 | Principles of Animal Behaviour | 0.50 |
| ANSC*4040 | Digital Technologies for Animal Production Systems | 0.50 |
| ANSC*4090 | Applied Animal Behaviour and Welfare | 0.50 |
| ANSC*4100 | Applied Environmental Physiology and Animal Housing | 0.50 |
| ANSC*4490 | Applied Endocrinology | 0.50 |
| ANSC*4650 | Comparative Immunology | 0.50 |
| EQN*3250 | Equine Exercise Physiology | 0.50 |

Option B - Research

| Code | Title | Credits |
|------|-------|---------|
|------|-------|---------|

Semester 5 - Fall

| | | |
|--|--|------|
| AGR*3450 | Research Methods in Agricultural Science | 0.50 |
| ANSC*3080 | Agricultural Animal Physiology | 0.50 |
| ANSC*3120 | Introduction to Animal Nutrition | 0.50 |
| NUTR*3210 | Fundamentals of Nutrition | 0.50 |
| 0.50 electives or restricted electives | | 0.50 |

Semester 6 - Winter

| | | |
|--|-----------------------|------|
| ANSC*3040 | Animal Reproduction | 0.50 |
| ANSC*3270 | Animal Disorders | 0.50 |
| MBG*3060 | Quantitative Genetics | 0.50 |
| 1.00 electives or restricted electives | | 1.00 |

Summer Semester

| | | |
|-----------|--------------------|------|
| COOP*2000 | Co-op Work Term II | 0.50 |
|-----------|--------------------|------|

Fall Semester

| | | |
|-----------|---------------------|------|
| COOP*3000 | Co-op Work Term III | 0.50 |
|-----------|---------------------|------|

Winter Semester

| | | |
|-----------|--------------------|------|
| COOP*4000 | Co-op Work Term IV | 0.50 |
|-----------|--------------------|------|

Summer Semester

No academic semester or work term

Semester 7 - Fall

| | |
|--|------|
| 2.50 electives or restricted electives | 2.50 |
|--|------|

Semester 8 - Winter

| | |
|--|------|
| 2.50 electives or restricted electives | 2.50 |
|--|------|

Restricted Electives - Option B

Students should note that some restricted electives require other courses not included among the required courses for the major as prerequisites.

Students should consult the most recent undergraduate calendar for specific requirements.

- A minimum of 1.00 credits from the following list (normally to be taken during semesters 7 and 8):

| Code | Title | Credits |
|-----------|-------------------------------------|---------|
| ANSC*4350 | Experiments in Animal Biology | 0.50 |
| ANSC*4610 | Critical Analysis in Animal Science | 0.50 |
| ANSC*4700 | Research in Animal Biology I | 0.50 |
| ANSC*4710 | Research in Animal Biology II | 0.50 |

- A minimum of 3.00 credits is required from the following lists:

| Code | Title | Credits |
|------|-------|---------|
|------|-------|---------|

Select a minimum of 0.50 credits from the following:

| | | |
|-----------|--|------|
| ANSC*4050 | Biotechnology in Animal Science | 0.50 |
| MBG*4020 | Genetics of Companion Animals | 0.50 |
| MBG*4030 | Animal Breeding Methods and Applications | 0.50 |

Select a minimum of 1.00 credits from the following:

| | | |
|-----------|---------------------------------|------|
| ANSC*3170 | Nutrition of Fish and Crustacea | 0.50 |
| ANSC*3180 | Wildlife Nutrition | 0.50 |
| ANSC*4260 | Beef Cattle Nutrition | 0.50 |
| ANSC*4270 | Dairy Cattle Nutrition | 0.50 |
| ANSC*4280 | Poultry Nutrition | 0.50 |
| ANSC*4290 | Swine Nutrition | 0.50 |
| ANSC*4470 | Animal Metabolism | 0.50 |
| ANSC*4560 | Pet Nutrition | 0.50 |
| EQN*4020 | Advanced Equine Nutrition | 0.50 |

Select a minimum of 1.00 credits from the following:

| | | |
|-----------|--|------|
| AGR*3200 | Computing for Bioscientists | 0.50 |
| ANSC*3050 | Aquaculture: Advanced Issues | 0.50 |
| ANSC*3090 | Principles of Animal Behaviour | 0.50 |
| ANSC*4040 | Digital Technologies for Animal Production Systems | 0.50 |

| | | |
|-----------|---|------|
| ANSC*4090 | Applied Animal Behaviour and Welfare | 0.50 |
| ANSC*4100 | Applied Environmental Physiology and Animal Housing | 0.50 |
| ANSC*4490 | Applied Endocrinology | 0.50 |
| ANSC*4650 | Comparative Immunology | 0.50 |
| EQN*3250 | Equine Exercise Physiology | 0.50 |