

PENNS^{TATE}




College of Agricultural Sciences
Department of Dairy and Animal Science
Department of Poultry Science

ANIMAL SCIENCES

UNDERGRADUATE STUDENT HANDBOOK

Penn State Animal Sciences

Department of Dairy and Animal Science
Department of Poultry Science

PENNSTATE
 College of Agricultural Sciences

ANIMAL SCIENCES MAJOR

Cooperating Departments

<http://www.das.psu.edu>

<http://www.poultry.cas.psu.edu>

Department of Dairy and Animal Science
324 William L. Henning Building
The Pennsylvania State University
University Park, PA 16802
814-863-3665

Department of Poultry Science
213 William L. Henning Building
The Pennsylvania State University
University Park, PA 16802
814-865-3411

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Department Head and Distinguished Professor
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Department Head and Professor of Poultry Nutrition and
Biochemistry
relkin@psu.edu

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ANIMAL SCIENCES MAJOR

The Animal Sciences Major is a four-year program leading to the Bachelor of Science Degree. The primary objective of this program is to provide the opportunity for the student to develop expertise in many aspects of the animal industries, to develop skills in communication and quantification, and to obtain a broad understanding of the natural sciences, arts, humanities, social and behavioral sciences.

This major offers two options (business/management and science) so that students may select numerous areas of study to help them gain employment in the many and diverse career opportunities available in the Animal Sciences. Courses in both options can be selected by students to plan a program consistent with their personal interests and professional goals. Specific requirements of the major are listed in the Baccalaureate Degree Programs Bulletin (<http://www.psu.edu/academic/bluebook/>).

Specific courses are required to develop basic and applied knowledge in nutrition, genetics, reproduction, economics, business management, agronomy, and animal products. Other courses will be selected to increase knowledge in biological and physical sciences, economics and business, and production agriculture depending on the option selected and the student's interest.

Students may explore special interest areas through independent study. Internships and summer employment offer opportunities to obtain a variety of work experiences. These activities are encouraged to prepare students for their chosen career goals.

Employment opportunities available to graduates of the Animal Sciences Major include, but are not limited to, technical sales and service for companies supplying feed, equipment, pharmaceuticals and other related agriculture products; promotion, public relations and human resources, and editorial positions; banking and insurance; county extension and other government agencies; management trainee for agri-business industries; herdspeople, flock supervisors, returning to the family farm, assistant farm managers; breed associations and artificial insemination and embryo transfer firms; and livestock buyers, inspectors, supervisors and quality control personnel in the meats and poultry industries. Graduates also may pursue post-baccalaureate study through graduate school to prepare for careers in research, teaching, or extension. Others may include their studies in veterinary medicine.

**ANIMAL SCIENCES MAJOR
SCIENCE OPTION
124 Total Credits Required**

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^a Required to complete one of the following: MATH 021 GQ(3), 022 GQ(3), 110 GQ(4), or 140 GQ(4); recommend MATH 110 GQ(4) or 140 GQ(4).

^b Required to complete one of the following: CMPSC 101 GQ(3), 203 GQ(4), MATH 022 GQ(3), 111 GQ(2), 141 GQ(4), STAT 100 GQ(3), 200 GQ(4), or 250 GQ(3).

^c PHYS 251 is required for admission to veterinary school; students with a poultry interest are encouraged to schedule AN SC 211; students interested in meats or livestock judging should enroll in AN SC 324; students interested in horse judging should enroll in AN SC 217.

^d Required to complete 5-7 credits of the following in addition to major requirements (Courses that fulfill major requirements do not count in this area): AN SC 405(3), 407(3), 410(4), 413(3), 414(3) 418(3), 419W(3), 420(4), 425(3), 427(3), 432(2), 450(3), 457(3), 467(3), FD SC 408(2), 409W(3), 415(3), and VB SC 402(3), 405(3), 420(3), 423W(3); WFS 407(3), 408(3), 430(3), 447W(3), 460(3).

^e Required to complete one of the following: ENGL 50 (GA), 210, 212, 213, 215, any foreign language (001-003), SPAN 105; CAS 212, 213, 250, 352; AEE 330W, 360, 440; AN SC 417 and 426, or AN SC 421 and 426, or AN SC 422 and 426, or AN SC 424 and 426. (AN SC courses cannot count as supporting courses and fulfill communication skills requirement)

^f Recommend ENGL 202C GWS, Technical Writing

* A grade of C or higher is required to graduate (16 credits) - Senate Policy 82 - 44.

▼ Course titles available on the semester schedule of Animal Science courses offered.

PROGRESS REPORT

MAJOR: ANIMAL SCIENCES OPTION: SCIENCE NAME: _____ STUDENT NUMBER: _____
 CREDITS REQUIRED: 124 ADVISOR: _____

REQUIREMENTS FOR THE MAJOR (87-97 CREDITS)																																																																	
GENERAL EDUCATION REQUIREMENTS (45 CREDITS)	COMMON REQUIREMENTS FOR MAJOR (35-41 CREDITS)		REQUIREMENTS FOR OPTION (52-55 CREDITS)																																																														
FIRST YEAR SEMINAR (1) (S) <hr/> <hr/> WRITING SPEAKING SKILLS (9) GWS ENGL 015 <i>or</i> 030 _____ ENGL 202 _____ CAS 100 _____ <hr/> QUANTIFICATION SKILLS (6) GQ <hr/> <hr/> <hr/> NATURAL SCIENCES (9) GN <hr/> <hr/> <hr/> <hr/> ▲ ARTS (6) GA <hr/> <hr/> <hr/> <hr/> ▲ HUMANITIES (6) GH <hr/> <hr/> <hr/> <hr/> ▲ SOCIAL & BEHAVIORIAL SCIENCES (6) GS <hr/> <hr/> <hr/> <hr/> HEALTH & PHYSICAL ACT (3) GHA <hr/> <hr/> <hr/> <hr/> ▲ ELECTIVES (0-14 CREDITS) <hr/> <hr/> <hr/> <hr/> ▲ Must include 3 credits of U.S. (US) and 3 credits of International (IL) Cultures	COMMON PRESCRIBED (21 CREDITS) <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 70%;"></th> <th style="width: 10%; text-align: center;">CR</th> <th style="width: 20%; text-align: center;">GD</th> </tr> </thead> <tbody> <tr><td>* AN SC 201</td><td style="text-align: center;">4</td><td style="text-align: center;">_____</td></tr> <tr><td>* AN SC 207 & 208</td><td style="text-align: center;">3</td><td style="text-align: center;">_____</td></tr> <tr><td>AN SC 290W</td><td style="text-align: center;">1</td><td style="text-align: center;">_____</td></tr> <tr><td>* AN SC 300 GN</td><td style="text-align: center;">3</td><td style="text-align: center;">_____</td></tr> <tr><td>* AN SC 301</td><td style="text-align: center;">3</td><td style="text-align: center;">_____</td></tr> <tr><td>BMB 211</td><td style="text-align: center;">3</td><td style="text-align: center;">_____</td></tr> <tr><td>CHEM 202</td><td style="text-align: center;">3</td><td style="text-align: center;">_____</td></tr> </tbody> </table> ADDITIONAL (11-15 CREDITS) AG BM 101 GS <i>or</i> ECON 002 GS 3 _____ * AN SC 305, 306, 308, 309, 310 311, 324, <i>or</i> 327 3-4 _____ MATH 021 GQ, 022 GQ, 110 GQ, <i>or</i> 140 GQ 3-4 _____ CMPSC 101 GQ, 203 GQ; MATH 022 GQ, 111 GQ, 141 GQ; STAT 100 GQ, 200 GQ, <i>or</i> 250 GQ 2-4 _____ SUPPORTING COURSES AND RELATED AREAS: (3-5 CREDITS) Communication Skills ^e 3-5 _____ * A grade of C or higher must be obtained to graduate – Policy 82-44. ** Writing across the curriculum designation. Required to complete 3 credits within the College			CR	GD	* AN SC 201	4	_____	* AN SC 207 & 208	3	_____	AN SC 290W	1	_____	* AN SC 300 GN	3	_____	* AN SC 301	3	_____	BMB 211	3	_____	CHEM 202	3	_____	SCIENCE OPTION PRESCRIBED (34 CREDITS) <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 70%;"></th> <th style="width: 10%; text-align: center;">CR</th> <th style="width: 20%; text-align: center;">GD</th> </tr> </thead> <tbody> <tr><td>AN SC 423</td><td style="text-align: center;">3</td><td style="text-align: center;">_____</td></tr> <tr><td>AN SC 431W**</td><td style="text-align: center;">4</td><td style="text-align: center;">_____</td></tr> <tr><td>BIOL 110 GN</td><td style="text-align: center;">4</td><td style="text-align: center;">_____</td></tr> <tr><td>BMB 212</td><td style="text-align: center;">1</td><td style="text-align: center;">_____</td></tr> <tr><td>BMB 221</td><td style="text-align: center;">2</td><td style="text-align: center;">_____</td></tr> <tr><td>CHEM 110 & 111 GN</td><td style="text-align: center;">4</td><td style="text-align: center;">_____</td></tr> <tr><td>CHEM 112 & 113 GN</td><td style="text-align: center;">4</td><td style="text-align: center;">_____</td></tr> <tr><td>CHEM 203</td><td style="text-align: center;">3</td><td style="text-align: center;">_____</td></tr> <tr><td>MICRB 201</td><td style="text-align: center;">3</td><td style="text-align: center;">_____</td></tr> <tr><td>MICRB 202</td><td style="text-align: center;">2</td><td style="text-align: center;">_____</td></tr> <tr><td>PHYS 250 GN</td><td style="text-align: center;">4</td><td style="text-align: center;">_____</td></tr> </tbody> </table> ADDITIONAL (13-14 CREDITS) AGRO 028, SOILS 101 <i>or</i> AN SC 213 3 _____ AN SC 322, BIOL 133 GN <i>or</i> 222 3 _____ BIOL 220W GN, 230W GN, <i>or</i> 240W GN 4 _____ AN SC 306, 308, 309, 405, 407, 410, 413 3-4 _____ SUPPORTING COURSES AND RELATED AREAS (5-7 CREDITS) *** AN SC 405(3), 407(3), 410(4), 413(3), 414(3), 418(3), 419W(3), 420(4), 425(3), 427(3), 432(2), 450(3), 457(3), 467(3); FD SC 408(2), 409W(3), 415(3); VB SC 402(3), 405(3), 420(3), 423W(3); WFS 407(3), 408 (3), 430(3), 447W(3), 460(3). 5-7 _____ *** Courses that fulfill major requirements do not count in this area.				CR	GD	AN SC 423	3	_____	AN SC 431W**	4	_____	BIOL 110 GN	4	_____	BMB 212	1	_____	BMB 221	2	_____	CHEM 110 & 111 GN	4	_____	CHEM 112 & 113 GN	4	_____	CHEM 203	3	_____	MICRB 201	3	_____	MICRB 202	2	_____	PHYS 250 GN	4	_____
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**ANIMAL SCIENCES MAJOR
BUSINESS/MANAGEMENT OPTION
124 Total Credits Required**

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	13-15		11-16

THIRD SEMESTER	CREDITS	FOURTH SEMESTER	CREDITS
▼AN SC 201*	4	ACCTG 211 - Fin Mgl Acc Dec Mk	4
▼AN SC 290W	1	AG BM 200 – Introduction to Agribus	
▼AN SC 207and 208*	3	MGMT, or MGMT 100 - Survey of Mgmt	3
AG BM 102 – Econ Food System or		▼AN SC 300 (GN)*	3
MKTG 221 - Contemp Am Mktg	3	BMB 211 - Elem Biochem	3
CHEM 202 - Organic Chem	3	Social and Behavioral Sciences selection (GS)	3
Health and Physical Activity (GHA)	<u>1.5</u>		<u>16</u>
	15.5		16

FIFTH SEMESTER	CREDITS	SIXTH SEMESTER	CREDITS
▼AN SC 301*	3	▼AN SC 305, 306, 308, 309, 310, 311, 324, 327, 405, 407, 410	3-4
▼AN SC 305*, 306*, 308*, 309*, 310*, 311*, 324*, 327*	3-4	ENGL 202 selection (GWS)	3 ^d
▼AN SC 322	3	MICRB 106 - Elem Micrb (GN) or MICRB 201 - Intro Microbiology	3
Elective	1-3	MICRB 107 - Elem Micrb Lab (GN) or MICRB 202 - Intro Micrb Lab	1-2
Health and Physical Activity (GHA)	1.5	CAS 100 - Effective Speech (GWS)	3
Supporting Courses	<u>3^c</u>	Supporting Courses	<u>3^c</u>
	14.5-17.5		16-18

SEVENTH SEMESTER	CREDITS	EIGHTH SEMESTER	CREDITS
▼AN SC 420, 423, 427, 431W,	3-4	Arts selection (GA)	3
Humanities selection (GH)	3	Electives	0-2
Supporting Courses	<u>9^c</u>	Supporting Courses	8 ^c
	15-16	Communication Skills selection	<u>3-5^e</u>
			14-18

^a Required to complete one of the following: MATH 021 GQ(3), 022 GQ(3), 110 GQ(4), or 140 GQ(4); recommend MATH 110 GQ(4).

^b Required to complete one of the following: CMPSC 101 GQ(3), 203 GQ(4), MATH 022 GQ(3), 111 GQ(2), 141 GQ(4), STAT 100 GQ(3), 200 GQ(4), or 250 GQ(3).

^c Required to complete 23 credits from the department list (at least 9 credits of business and 9 credits of production courses; 12 credits must be 400 - level courses). Courses that fulfill major requirements or the additional production course for the option will not count in this area. Students interested in meats or livestock judging should enroll in AN SC 324; students interested in horse judging should enroll in AN SC 217; students interested in poultry judging should enroll in AN SC 421.

^d Recommend ENGL 202D GWS, Business Writing.

^e Required to complete one of the following: ENGL 50 (GA), 210, 212, 213, 215; any foreign language (001-003), SPAN 105, CAS 212, 213, 250, 352; AEE 330W, 360, 440; AN SC 417 and 426, or AN SC 421 and 426, or AN SC 422 and 426, or AN SC 424 and 426 (AN SC courses cannot count as supporting courses and fulfill communication skills requirement).

* A grade of C or higher is required to graduate (16 credits) - Senate Policy 82 - 44.

▼ Course titles available on the semester schedule of Animal Science courses offered.

PROGRESS REPORT

MAJOR: ANIMAL SCIENCES OPTION: BUSINESS MANAGEMENT

NAME: _____

STUDENT NUMBER: _____

CREDITS REQUIRED: 124

ADVISOR: _____

REQUIREMENTS FOR THE MAJOR (87-97 CREDITS)

GENERAL EDUCATION REQUIREMENTS (45 CREDITS)	COMMON REQUIREMENTS FOR MAJOR (35-41 CREDITS)	REQUIREMENTS FOR OPTION (53-56 CREDITS)																																				
FIRST YEAR SEMINAR (1) (S) _____	COMMON PRESCRIBED (21 CREDITS)	BUS/MGT OPTION PRESCRIBED (10 CREDITS)																																				
WRITING SPEAKING SKILLS (9) GWS ENGL 015 <i>or</i> 030 _____ ENGL 202 _____ CAS 100 _____	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th style="text-align: center;">CR</th> <th style="text-align: center;">GD</th> </tr> </thead> <tbody> <tr> <td>* AN SC 201</td> <td style="text-align: center;">4</td> <td style="text-align: center;">_____</td> </tr> <tr> <td>* AN SC 207 & 208</td> <td style="text-align: center;">3</td> <td style="text-align: center;">_____</td> </tr> <tr> <td>AN SC 290W</td> <td style="text-align: center;">1</td> <td style="text-align: center;">_____</td> </tr> <tr> <td>* AN SC 300 GN</td> <td style="text-align: center;">3</td> <td style="text-align: center;">_____</td> </tr> <tr> <td>* AN SC 301</td> <td style="text-align: center;">3</td> <td style="text-align: center;">_____</td> </tr> <tr> <td>BMB 211</td> <td style="text-align: center;">3</td> <td style="text-align: center;">_____</td> </tr> <tr> <td>CHEM 202</td> <td style="text-align: center;">3</td> <td style="text-align: center;">_____</td> </tr> </tbody> </table>		CR	GD	* AN SC 201	4	_____	* AN SC 207 & 208	3	_____	AN SC 290W	1	_____	* AN SC 300 GN	3	_____	* AN SC 301	3	_____	BMB 211	3	_____	CHEM 202	3	_____	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th style="text-align: center;">CR</th> <th style="text-align: center;">GD</th> </tr> </thead> <tbody> <tr> <td>ACCT 211</td> <td style="text-align: center;">4</td> <td style="text-align: center;">_____</td> </tr> <tr> <td>AN SC 322</td> <td style="text-align: center;">3</td> <td style="text-align: center;">_____</td> </tr> <tr> <td>CHEM 101</td> <td style="text-align: center;">3</td> <td style="text-align: center;">_____</td> </tr> </tbody> </table>		CR	GD	ACCT 211	4	_____	AN SC 322	3	_____	CHEM 101	3	_____
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AN SC 322	3	_____																																				
CHEM 101	3	_____																																				
QUANTIFICATION SKILLS (6) GQ _____ _____	ADDITIONAL (11-15 CREDITS)	ADDITIONAL (20-23 CREDITS)																																				
NATURAL SCIENCES (9) GN _____ _____ _____	AG BM 101 GS <i>or</i> ECON 002 GS 3 _____	AG BM 102 <i>or</i> MKTG 221 3 _____ AG BM 200 <i>or</i> MGMT 100 3 _____ AN SC 305, 306, 308, 309, 310, 311, 324, 327, 405, 407, 410 3 _____																																				
▲ ARTS (6) GA _____ _____	* AN SC 305, 306, 308, 309, 310 311, 324, <i>or</i> 327 3-4 _____	AN SC 420, 423, 427, 431W 3-4 _____																																				
▲ HUMANITIES (6) GH _____ _____	MATH 021 GQ, 022 GQ, 110 GQ, <i>or</i> 140 GQ 3-4 _____	BIOL 110 <i>or</i> BIOL 011 GN & 012 GN 4 _____																																				
▲ SOCIAL & BEHAVIORAL SCIENCES (6) GS _____ _____	CMPC 101 GQ, 203 GQ; MATH 022 GQ, 111 GQ, 141 GQ; STAT 100 GQ, 200 GQ, <i>or</i> 250 GQ 2-4 _____	MICRB 106 GN <i>or</i> 201 3 _____ MICRB 107 GN <i>or</i> 202 1-2 _____																																				
HEALTH & PHYSICAL ACT (3) GHA _____ _____	SUPPORTING COURSES AND RELATED AREAS: (3-5 CREDITS)	SUPPORTING COURSES AND RELATED AREAS (23 CREDITS) ***																																				
▲ ELECTIVES (0-14 CREDITS) _____ _____	<i>Communication Skills</i> ^e 3-5 _____	Select 23 credits from the Department list. At least 9 credits in business and 9 credits in production courses and at least 12 credits must be at the 400-level.** Business Selections: _____ _____ _____ Production Selections: _____ _____ _____ Additional Selections: _____ _____ _____																																				
▲ Must include 3 credits of U.S. (US) and 3 credits of International (IL) Cultures	* A grade of C or higher must be obtained to graduate – Policy 82-44. ** Writing across the curriculum designation. Required to complete 3 credits <i>within the College</i>	*** Courses that fulfill major requirements do not count in this area.																																				

Animal Sciences Major Business/Management Option Supporting Courses

Select 23 additional credits from the following list. At least 9 credits of business and 9 credits of production courses (Courses that fulfill major requirements or the additional production course for the option cannot count as a supporting course.); 12 of the 23 credits must be 400-level courses. Courses required in the major cannot be counted to meet these 12 credits of 400-level courses.

Business Selections:

<u>Course (credits)</u>	<u>Title</u>	<u>Semester Offered</u>
AG 301W (3)**	Introduction to Agricultural Law	Fall
AG BM 106 (3)	Agribusiness Problem Solving	Fall, Spring
AG BM 220 (3)	Agribusiness Sales Marketing	Spring
AG BM 302 (3)	Food Product Marketing	Fall
AG BM 308W (3)**	Strategic Decision Making in Agribusiness	Fall, Spring
AG BM 320 (3)	Market and Prices	Spring
AG BM 338 (3)	Global Agribusiness	Fall, Spring
AG BM 407 (3)	Farm Planning and Financial Management	Spring
AG BM 408 (3)	Financial Decision Making for Agribusiness	Spring
AG BM 438 (3)	Economics of Managing Global Agriculture and Food Systems	Spring
AG BM 420 (3)	Agribusiness Markets and Prices	Spring
B A 250 (3)	Problems of Small Business	Fall, Spring
B LAW 243 (3)	Legal Environment of Business	Fall, Spring
FIN 100 (3)	Introduction to Finance	Fall, Spring
IST 110 (4)	Introduction to Information Sciences and Technology	Fall, Spring
IST 210 (3)	Organization of Data	Fall, Spring
LER 100(GS) (3)	Industrial Relations	Fall, Spring
LER 201(GS) (3)	Employment Law	Fall, Spring
MGMT 341 (3)	Human Resource Management	Fall, Spring
MKTG 220 or	Personal Selling; or	Fall, Spring
R EST 301 (3)	Real Estate Fundamentals	Fall, Spring
SCM 200 (4)	Introduction to Statistics for Business	Fall, Spring
SCM 301 (3)	Business Logistics Management	Spring

**Writing Across the Curriculum designation. Required to complete 3 credits within the College.

Production Selections:


AGRO 028 (3)	Principles of Crop Management	Fall
AGRO 423 (3)	Forage Crop Management	Fall
AGRO 425 (3)	Field Crop Management	Spring
AN SC 117	Equine Marketing	Spring
AN SC 211 (3)	Introduction to Avian Biology	Spring
AN SC 213 (3)	Introduction to Animal Biotechnology	Spring
AN SC 215 (GS) (3)	Pets in Society	Summer, Fall, Spring
AN SC 217 (2)	Introduction to Horse Judging	Fall
AN SC 305 (3)	Companion Animal Nutrition and Management	Fall
AN SC 306 (3)	Swine Production and Management	Fall (odd years)
AN SC 308 (4)	Sheep and Goat Production and Management	Spring (odd years)
AN SC 309 (4)	Beef Cattle Production and Management	Spring
AN SC 310 (3)	Dairy Cattle Production and Management	Spring
AN SC 311 (4)	Poultry Production and Management	Fall
AN SC 315 (3)	Small Animal Health	Spring
AN SC 324 (3)	Value Determination of Meat Animals	Fall
AN SC 327 (3)	Horse Production and Management	Fall
AN SC 350	Dairy Problem Solving	Spring
AN SC 405 (3)	Advanced Canine Nutrition and Management	Fall
AN SC 407 (3)	Advanced Horse Management	Spring
AN SC 410 (4)	Advanced Dairy Herd Management	Fall
AN SC 413 (3)	Transgenic Biology	Spring
AN SC 414 (3)	Comprehensive Animal Biotechnology	Fall (even years)
AN SC 417 (2)*	Introduction to Horse Judging	Spring
AN SC (AGECO) (SOILS) 418 (3)	Nutrient Management in Agricultural Systems	Fall
AN SC 419W (3)**	Applied Animal Welfare	Fall (even years)
AN SC 420 (4)	Animal Nutrition and Feed Technology	Spring
AN SC 421 (2)*	Poultry Evaluation and Selection	Spring
AN SC 422 (3)*	Dairy Cattle Evaluation and Selection	Spring
AN SC 423 (3)	Comparative Physiology of Domestic Animals	Spring
AN SC 424 (3)*	Livestock Breeding Evaluation and Selection	Spring
AN SC (VB SC) 425 (3)	Principles of Avian Diseases	Spring (odd years)
AN SC 426 (2)*	Advanced Judging and Selection	Fall
AN SC 427 (3)	Milk Secretion	Spring
AN SC 431W (4)**	Physiology of Mammalian Reproduction	Fall
AN SC 432 (2)	Techniques in Cattle Reproduction	Fall
AN SC 450 (3)	Dairy Farm Management Systems	Spring
AN SC 457 (3)	Equine Reproduction	Fall
AN SC 467 (3)	Equine Nutrition	Fall
FD SC 200 (3)	Introductory Food Science	Fall
FD SC 408 (2)	Applied Food Microbiology	Fall
FD SC 409W (3)**	Laboratory in Applied Food Microbiology	Fall
FD SC 415 (3)	Science and Technology of Muscle Foods	Spring
SOILS 101 (3)	Introduction to Soils	Fall, Spring
VB SC 303 (3)	Principles of Animal Disease	Fall
V SC 402 (ENT) (3)	Biology of Animal Parasites	Spring
VB SC 405 (3)	Laboratory Animal Science	Spring
VB SC 407 (2)	Dairy Herd Health Programs	Spring
VB SC 420 (3)	General Animal Pathology	Fall
VB SC 423W (3)**	Pathology of Nutritional and Metabolic Diseases	Fall
WFS 407 (3)	Ornithology	Spring
WFS 408 (3)	Mammalogy	Spring
WFS 430 (3)	Conservation Biology	Fall
WFS 447W**	Wildlife Management	Fall
WFS 460 (3)	Conservation Behavior	Spring

*Cannot count as supporting production courses and fulfill communication skills requirement.

**Writing Across the Curriculum. Required to complete 3 credits within the College.

Penn State Animal Sciences Contacts

Department of Dairy and Animal Science
Department of Poultry Science

PENNSSTATE
 College of Agricultural Sciences

ADVISERS

<u>Name</u>	<u>Address</u>	<u>Telephone</u>	<u>Email Address</u>	<u>Interest Area</u>
Paul Bartell	205 Henning	863-2101	pab43@psu.edu	Avian Biology
Vivian Baumer	306 Henning	865-1363	vbaumer@psu.edu	Animal Nutrition
Phillip Clauer	213 Henning	863-8960	plcauer@psu.edu	Poultry
Pat Comerford	308 Ag Sc In	863-3657	pcomerford@psu.edu	Horses
Chad Dechow	333 Henning	863-3659	cdd1@psu.edu	Dairy, Genetics
Francisco Diaz	206 Henning	865-1499	fjd10@psu.edu	Reproductive Biology
Nancy Dreschel	312 Ag Sc In	863-4197	ndreschel@psu.edu	Small Animals/Behavior
Brian Egan	317 Henning	863-3957	began@psu.edu	Horses
Daniel Hagen	316 Henning	863-0723	dhagen@psu.edu	Reproductive Physiology
Harold Harpster*	315 Henning	863-0734	hharpster@psu.edu	Ruminant Nutrition & Companion Animals
Kevin Harvatine	301A Henning	865-6334	kjh182@psu.edu	Nutritional Physiology
Lisa Holden	339 Ag Sc In	863-3672	lholden@psu.edu	Dairy
Alexander Hristov	352 Ag Sc In	863-3669	anh13@psu.edu	Dairy Nutrition
Michael Hulet	222 Henning	863-8934	mrh4@psu.edu	Broiler & Turkey Mgmt.
Alan Johnson	213 Henning	867-3203	alj14@psu.edu	Poultry
Kenneth Kephart	306 Ag Sc In	863-3671	kkephart@psu.edu	Swine Management
Dan Kniffen	320 Ag Sc In	865-7809	dkniffen@psu.edu	Beef Cattle
Wansheng Liu	305 Henning	867-1673	wul12@psu.edu	Genomics
Robert Mikesell	303 Ag Sc In	865-2987	rem9@psu.edu	Beef and Swine

Edward Mills	304 Ag Sc In	865-2394	emills@psu.edu	Muscle Foods
Jon Oatley	322 Ag Sc In	865-5987	jmo15@psu.edu	Reproductive Biology
Michael O'Connor	315 Ag Sc In	863-3913	moconnor@psu.edu	Dairy and Physiology
Dale Olver	319 Henning	863-3914	dro105@psu.edu	Dairy
Troy Ott	321 Ag Sc In	441-2657	tlo12@psu.edu	Reproductive Biology
Joy Pate	318 Ag Sc In	863-0558	jpate@psu.edu	Reproductive Biology
Jana Peters**	313 Henning	863-4198	jpeters@psu.edu	Animal Science
Chris Raines	350 Ag Sc In	867-2880	crr11@psu.edu	Meat Science
Ramesh Ramachandran	211 Henning	865-5202	RameshR@psu.edu	Molecular Neuroendocrinology
Cooduvalli Shashikant	323 Ag Sc In	863-0658	shashi@psu.edu	Molecular Biology
Burt Staniar	301 Henning	865-0698	wbs14@psu.edu	Horses
Ann Swinker	309 Ag Sc In	865-7810	aswinker@psu.edu	Horses
Gabriella Varga	348 Ag Sc In	863-4195	gvarga@psu.edu	Dairy Nutrition
Karen Vines	313 Henning	865-3097	kvines@psu.edu	Beef Cattle, Horse

*Animal Sciences Program Coordinator

**Animal Sciences Advising Coordinator

CLERICAL SUPPORT

Lila Conklin	318 Henning	863-3664	lsc2@psu.edu
Molly Martin	312 Henning	865-7638	mjf217@psu.edu

Animal Sciences Minor

Cooperating Departments: Dairy and Animal Science Poultry Science

The Animal Sciences minor is designed for students who wish to supplement their academic major with studies in animal science.

Requirements

Students are required to complete a minimum of 20 credits, at least six of which must be at the 400 level. A grade of C or better must be obtained in each course in order to complete the minor. The core of prescribed courses develops a foundation in the various basic disciplines of animal science. Additional courses may be selected by the student to emphasize the production/management of beef cattle, companion animals, dairy cattle, horses, poultry, sheep, or swine, or to emphasize genetics, nutrition or physiology.

Prescribed courses:

AN SC 201(4):	Animal Science
AN SC 290W(1):	Careers in Animal Agriculture
AN SC 207(2):	(FD SC) Animal Products Technology AND
AN SC 208(1):	(FD SC) Animal Products Technology Lab OR
AN SC 300(GN)(3):	Integrated Animal Biology
AN SC 301(3):	Principles of Animal Nutrition

Additional Courses:

The student must select 3 credits from the following list:

AN SC 305(3)	Companion Animal Nutrition
AN SC 306(3):	Swine Production and Management
AN SC 308(4):	Sheep and Goat Production and Mgmt.
AN SC 309(4):	Beef Cattle Production and Management
AN SC 310(3):	Dairy Cattle Production and Mgmt.
AN SC 311(4):	Poultry Production and Management
AN SC 327(3):	Horse Production and Management

The student must select, in consultation with the Undergraduate Program Coordinator, at least 6 credits at the 400 level from the following list:

AN SC 405(3):	Advanced Canine Nutrition and Management
AN SC 407(3):	Advanced Horse Management
AN SC 410(4):	Advanced Dairy Herd Management
AN SC 413(3):	Transgenic Biology
AN SC 417(2):	Introduction to Horse Judging
AN SC 418(3)	Nutrient Management in Agricultural Systems
AN SC 419W(3)	Applied Animal Welfare
AN SC 420(4):	Animal Nutrition and Feed Technology
AN SC 421(2)	Poultry Evaluation and Selection
AN SC 422(3):	Dairy Cattle Evaluation and Selection
AN SC 423(3):	Comparative Physiology of Domestic Animals
AN SC 424(3):	Livestock Breeding Evaluation and Selection
AN SC 425(3):	(VB SC) Principles of Avian Diseases
AN SC 426	Advanced Judging and Selection
AN SC 427(3):	Milk Secretion
AN SC 431W(4):	Physiology of Mammalian Reproduction
AN SC 432(2):	Techniques in Cattle Reproduction
AN SC 437(3):	Equine Facilitated Therapy
AN SC 450(3):	Dairy Farm Management Systems
AN SC 457(3):	Equine Reprod. and Breeding Farm Mgmt.
AN SC 467(3):	Equine Nutrition and Feeding

Procedures for Enrollment

Students may apply for admission to the Animal Sciences minor by consulting with the Undergraduate Program Coordinator, Dr. Harold Harpster, 315 William L. Henning Building, University Park, PA 16802, phone (814) 863-0734. Email address: hharpster@psu.edu. Approval by the student's major program adviser is required.



Equine Science Minor

Department of Dairy and Animal Science

The Equine Science Minor is designed for students who wish to supplement their academic major with studies in equine science.

Requirements

Students are required to complete a minimum of 20 credits, at least 8 of which must be at the 400 level. A grade of C or better must be obtained in each course in order to complete the minor. The core of prescribed courses develops a foundation in the basic discipline of animal science and equine science. Additional courses may be selected by the student to emphasize other special areas of interest in management principles, equine science, or general animal genetics and breeding, nutrition, and physiology.

Prescribed Courses:

AN SC 037 (2)	FA	Horse and Man
AN SC 201 (4)	FA/SP	Animal Science
AN SC 217 (2)	FA/SP	Introduction to Horse Judging
AN SC 327 (3)	FA	Horse Production and Management
AN SC 407 (3)	SP	Advanced Horse Management

The student must select one course from the following list:

AN SC 300 (3) (GN)	SP	Integrated Animal Biology
AN SC 301 (3)	FA	Principles of Animal Nutrition
AN SC 317 (3)	SP	Horse Handling and Training
AN SC 322 (3)	FA	Principles of Animal Breeding
BA 250 (3)	SP	Problems of Small Business
KINES 180 (3)	FA/SP	Introduction to Kinesiology
KINES 202 (4)	FA/SP	Applied Human Anatomy
VB SC 303 (3)	FA	Principles of Animal Disease

The student must select, in consultation with the Equine Minor Coordinator, one course at the 400 level from the following list:

AN SC 417 (2)	SP	Horse Judging
AN SC 420 (4)	SP	Animal Nutrition and Feed Technology
AN SC 423 (3)	SP	Comparative Physiology of Domestic Animals
AN SC 426 (2)	FA/SP	Advanced Judging and Selection
AN SC 431W (4)	FA	Physiology of Mammalian Reproduction
AN SC 447	FA	Applied Equine Behavior
AN SC 457 (3)	FA	Equine Reproduction
AN SC 467 (3)	FA	Equine Nutrition
AGRO 423 (3)	SP	Forage Crop Management

Procedures for Enrollment

For additional information on the Equine Science Minor please contact the Coordinator, Karen Vines, 313 Henning Building, University Park, PA 16802, phone (814) 865-3097, email address: kvines@psu.edu. You may also contact the Animal Sciences Program Coordinator, Dr. Harold W. Harpster, 315 Henning Building, University Park, PA 16802, phone (814) 863-0734, email address: hharpster@psu.edu. Students interested in the Equine Science Minor should consult with Karen Vines to complete an Application for Admission to a Minor Program form. Approval by the student's major program adviser is required.

POULTRY AND AVIAN SCIENCE MINOR

Department of Poultry Science
College of Agricultural Sciences

The Poultry and Avian Science (P A S) Minor is designed for students who wish to supplement their academic major with studies focused on the biology and management of avian species, with an emphasis on domestic fowl. In recognition of the diverse career opportunities in the modern poultry and game bird industries, the minor is designed to also accommodate students with primary interests in agribusiness management, food science, and wildlife science. The University's Poultry Education and Research Center is used extensively for supplementing classroom work with hands-on laboratories. The flexibility of the minor permits program planning commensurate with an individual's interests and professional goals and should enhance the student's ability to compete for related positions in industry, government, and academia (graduate or professional school).

REQUIREMENTS

Students are required to complete a minimum of 19 credits (9 at the 400 level). The three prescribed courses provide a foundation of knowledge pertaining to both avian sciences and the commercial poultry industry, while additional courses selected by the student will allow for further specialization in the foundation animal science disciplines, agribusiness management, food science, and wildlife and fisheries science. In addition, credits from poultry or avian internship experiences and/or independent study projects may also be applied towards meeting the requirements of the minor. A grade of C or better is required for all courses in the minor.

PRESCRIBED COURSES (10 CREDITS)

- AN SC 211 (3) Introduction to Avian Biology
(Sem: 1-4)
- AN SC 311 (4) Poultry Production and Management
(Sem: 5-7)
- AN SC 425 (3) Principles of Avian Diseases
(Sem: 6-8)

ADDITIONAL COURSES (9 CREDITS)*

The student must select 3 credits from the following:

- | | |
|------------------|--|
| AG BM 302 (3) | Food Product Marketing |
| AG BM 338 (3) | Agribusiness in the Global Economy |
| AN SC 207 (2) | Animal Products Technology |
| AN SC 208 (1) | Animal Products Technology
Laboratory |
| AN SC 300 (3) | Integrated Animal Biology |
| AN SC 301(3) | Principles of Animal Nutrition |
| AN SC 322 (3) | Principles of Animal Breeding |
| AN SC 395* (1-3) | Animal Science Internship |
| W F S 300 (2) | The Vertebrates |
| W F S 301 (2) | Vertebrate Laboratory |

The student must select 6 credits from the following:

- | | |
|----------------|--|
| AG BM 407 (3) | Farm Planning and Financial
Management |
| AG BM 408 (3) | Financial Decision Making for
Agribusiness |
| AG BM 420 (3) | Agribusiness Markets and Prices |
| AG BM 460 (3) | Managing the Food System |
| AN SC 418 (3) | Nutrient Management in Agricultural
Systems |
| AN SC 420 (4) | Animal Nutrition and Feed
Technology |
| AN SC 421 (2) | Poultry Evaluation and Selection |
| AN SC 423 (3) | Comparative Physiology of Domestic
Animals |
| AN SC 496 (3)* | Independent Studies |
| FD SC 408 (2) | Food Microbiology |
| FD SC 409W (3) | Laboratory in Food Microbiology |
| FD SC 411 (2) | Managing Food Quality |
| FD SC 415 (3) | Science and Technology of Muscle
Foods |
| VB SC 420 (3) | General Animal Pathology |
| WFS 406 (1) | Ornithology Laboratory |
| WFS 407 (3) | Ornithology |
| WFS 447W (3) | Wildlife Management |


*AN SC 395 and AN SC 496 must have a poultry or avian biology emphasis

PROCEDURES FOR ENROLLMENT

Applications will be accepted anytime after the student has achieved at least fifth semester classification, but not later than the end of the sixth week of the student's final semester. Submit a completed *Entrance to Minor Application* form to Dr. Robert G. Elkin, Professor and Head, Department of Poultry Science, 213 Henning Building, University Park, PA 16802; phone (814.865.3411); e-mail (relkin@psu.edu). Approval by the student's major program advisor is also required.

Penn State Animal Sciences

Department of Dairy and Animal Science
Department of Poultry Science

PENNSSTATE
 College of Agricultural Sciences

ANIMAL SCIENCE COURSE DESCRIPTIONS

- Animal Science 117* **EQUINE MARKETING (2).** Principles of marketing and event planning including marketing systems, advertising, management systems, team building and other aspects of conducting a purebred livestock sale. Students learn through the planning and conducting of the annual Penn State Equine Science Showcase and Registered Quarter Horse Sale. Instructor: B. Egan.
- Animal Science 201* **ANIMAL SCIENCE (4).** Scope of animal and poultry science; genetic, physiological, nutritional, and health factors in food production. Instructor: D. Olver.
- Animal Science 037* **HORSE AND MAN (2).** Relationship of horse and man; development of breeds; use, adaptability, and economic importance of the horse in today's society. Instructor: T. L. Merritt.
- Animal Science 207* **AN SC 207 (FD SC 207) ANIMAL PRODUCTS TECHNOLOGY (2)** Composition, safety, palatability, preservation, and processing of foods from animals, impact of animal production, and handling practices on product properties. Instructor: E. W. Mills.
- Animal Science 208* **AN SC 208 (FD SC 208) ANIMAL PRODUCTS TECHNOLOGY LABORATORY (1)** Harvesting and processing of foods from animals; hands-on and demonstration exercises; industry procedures for processing meat, milk, and egg products. Prerequisite or concurrent: AN SC 207. Instructor: E. W. Mills.
- Animal Science 211* **INTRODUCTION TO AVIAN BIOLOGY (3).** Introduces the biology of birds; lectures, laboratories on anatomy and function, incubation, breeding, disease control, management techniques and students projects. Prerequisite or concurrent: BIOL 110; or BIOL 011, BIOL 012. Instructor: P. A. Bartell.
- Animal Science 213* **INTRODUCTION TO ANIMAL BIOTECHNOLOGY (3).** An introduction to the multidisciplinary area of animal biotechnology: from molecular, genetic, genomics and development issues to their technological applications. Prerequisites: AN SC 201, BIOL 110, CHEM 110, CHEM 112. Instructor: J. Oatley.
- Animal Science 215 (GS)* **PETS IN SOCIETY (3)** Introduction to the varied roles that companion animals play in human society and their impact on human activity and well-being. Instructor: N. A. Dreschel.
- Animal Science 217* **INTRODUCTION TO HORSE JUDGING (2)** Introductory analysis of halter and performance classes of stock-type horses, with emphasis on conformation, gaits, patterns, and oral reasons. Instructor: B. A. Egan.
- Animal Science 290W* **CAREERS IN ANIMAL AGRICULTURE (1).** A description and analysis of career opportunities in the animal science and allied industries. Instructors: H. W. Harpster, J. L. Peters and D. F. Wise.

Animal Science 296

INDEPENDENT STUDIES (1-18). Career projects or studies which are supervised on an individual basis and which fall outside the scope of formal classes. Dairy and Animal Science majors may apply a total of six credits of Animal Science 296 to the total credits required for graduation.

In order to pursue an independent study, the student must contact the faculty member and reach a mutual agreement regarding the topic, number of credits and mode of conduct. The student must complete a Course Proposal Form and return the form to the Department Office during the first five days of classes. Any faculty member may work with any student. Coordinator: H. W. Harpster.

Animal Science 297

SPECIAL TOPICS (1-9). Formal courses offered infrequently on a topic or special interest subject. Coordinator: H. W. Harpster.

Animal Science 300 (GN)

INTEGRATED ANIMAL BIOLOGY (3). An integrated study of the biology of domestic animal growth and the underlying cellular, endocrine, and immune systems involved. Prerequisites: BIOL 011 and BIOL 012, or BIOL 110; at least third semester standing. Instructors: T. Ott and R. Mikesell.

Animal Science 301

PRINCIPLES OF ANIMAL NUTRITION. (3). Nutrients and their metabolism; the nutritional requirements of livestock; the nutritional value of various feeds; principles of ration formulation. Prerequisite: three credits in biochemistry or organic chemistry. Instructor: K. Harvatine and A. Macrina.

Animal Science 305

COMPANION ANIMAL NUTRITION AND MANAGEMENT (3). Principles of care and nutrition and contemporary importance of companion animals with emphasis on canine and feline species. Prerequisite: AN SC 201. Instructors: H. W. Harpster and N. A. Dreschel.

Animal Science 306

SWINE PRODUCTION AND MANAGEMENT (3). Application of the principles of enterprise and facility development, operations management, quality control, public relations, marketing for the efficient operation of a swine production business. Prerequisite: AN SC 201. Instructor: K. B. Kephart.

Animal Science 308

SHEEP AND GOAT PRODUCTION AND MANAGEMENT (4). Application of principles of nutrition, breeding, physiology, health, facilities, marketing, and product development, to animal production agriculture. Prerequisite: AN SC 201. Instructors: H. W. Harpster and J. Marcos Fernandez.

Animal Science 309

BEEF CATTLE PRODUCTION AND MANAGEMENT (4). Application of principles of nutrition, breeding, physiology, health, facilities, and marketing to produce and manage beef efficiently. Prerequisite: AN SC 201. Instructor: D. M. Kniffen.

Animal Science 310

DAIRY CATTLE PRODUCTION AND MANAGEMENT (3). Principles of dairy management including the dairy industry, reproduction and housing. Prerequisite: AN SC 201. Instructors: A. J. Heinrichs, G. A. Varga, M. L. O'Connor, and D. R. Olver.

Animal Science 311

POULTRY PRODUCTION AND MANAGEMENT (4). The application of fundamental concepts and preparation for careers in the economically integrated commercial poultry industry. Prerequisite: AN SC 201. Instructor: M. Hulet.

Animal Science 315

SMALL ANIMAL HEALTH AND DISEASE (3). Introduction to the principles of small animal health, including the recognition, prevention and control of common small animal diseases. Prerequisite: MICRB 106 or MICRB 201. Instructor: N.A. Dreschel.

- Animal Science 317 **HORSE HANDLING AND TRAINING (3).** Responses of horses to various stimuli during the training period. Laboratory exercises involve extensive practice with young horses. Prerequisites: AN SC 327 and approved level of horsemanship. Instructor: B. A. Egan.
- Animal Science 322 **PRINCIPLES OF ANIMAL BREEDING (3).** The fundamental principles of genetics as applied to breeding farm animals. Instructor: C. D. Dechow.
- Animal Science 324 **VALUE DETERMINATION OF MEAT ANIMALS (3).** Live Animal and carcass evaluation of cattle, sheep, and swine to determine value of market animals and meat products. Instructor: R. Mikesell.
- Animal Science 327 **HORSE PRODUCTION AND MANAGEMENT (3).** Principles of selection, breeding, feeding, management and marketing of horses; emphasis on light leg horses. Prerequisite: AN SC 201. Instructor: B. A. Egan.
- Animal Science 350 **DAIRY PROBLEM SOLVING (2).** Students will use dairy records to analyze herd performance in order to identify bottlenecks for higher productivity. Instructor: C. D. Dechow.
- Animal Science 395 **ANIMAL SCIENCE INTERNSHIP (1-12).** Supervised field experience and study related to the student's major professional interest. Written and oral critique of the activity is required. Prerequisites: Dairy and Animal Science majors who have a GPA of 2.0 or higher, completed 6 credits in their major field of study and have obtained permission of their faculty advisor and course instructor. Coordinator: P. Clauer.
- Animal Science 405 **ADVANCED CANINE NUTRITION AND MANAGEMENT(3).** Application of biological principles to the care and nutrition of dogs; interactive discussions of contemporary nutrition and management issues. Prerequisites: AN SC 305. Instructor: H. W. Harpster.
- Animal Science 407 **ADVANCED HORSE MANAGEMENT (3).** Detailed study of anatomy and physiology of the horse as related to nutrition, reproduction, athletic ability, unsoundness and control of diseases and parasites. Detailed discussion of management practices, facility design and contemporary issues. Prerequisites: AN SC 327. Instructor: W. B. Staniar.
- Animal Science 410 **ADVANCED DAIRY HERD MANAGEMENT (4).** Application of dairy herd management principles using case studies and actual dairy farm situations. Students will be required to seek solutions to problems and to make management decisions using actual dairy farms and/or case studies. Prerequisites: AN SC 310. Prerequisite or concurrent: Prerequisites: AN SC 310, 350. Instructor: G. A. Varga.
- Animal Science 413 **TRANSGENIC BIOLOGY (3).** The principles and concepts used to generate genetically engineered animals by pronuclear, knockout, and cloning methods; and applied biotechnology applications. Prerequisite: a course in Molecular Biology and/or Biochemistry and/or Genetics. Instructor: C. Shashikant
- Animal Science 414 **COMPARATIVE ANIMAL BIOTECHNOLOGY (3).** A comprehensive review of the multidisciplinary area of animal biotechnology examining historical developments, current progress, and future directions. Prerequisite: 3 credits in molecular biology, genomics, genetics, or biotechnology courses. Instructor: C. Shashikant.
- Animal Science 417 **HORSE JUDGING (2)** Evaluation and selection of halter and performance horses, and presentation of oral reasons. Instructor: B. A. Egan.

Animal Science 418

AN SC 418 (AGEC 418) and (SOILS 418) NUTRIENT MANAGEMENT IN AGRICULTURAL SYSTEMS (3). Comprehensive review of nutrient flow in animal agricultural systems, environmental regulations, and environmental stewardship practices. Instructor: K. B. Kephart.

Animal Science 419W

APPLIED ANIMAL WELFARE (3). Assessment of management practices impacting animal welfare; devoted to livestock species, companion animals, captive exotic species, and animals in research. Prerequisite: AN SC 201 or 6 credits of biology. Instructor: K. B. Kephart.

Animal Science 420

ANIMAL NUTRITION AND FEED TECHNOLOGY (4). Feedstuff evaluation, quality control, handling, storage; life cycle feeding of beef cattle, dairy cattle, sheep, swine, horses, and poultry. Prerequisite: AN SC 301. Instructor: H. W. Harpster.

Animal Science 421

POULTRY EVALUATION AND SELECTION (2) Introduction and application of standards and principles used to evaluate live poultry and poultry products. Prerequisite: permission of program. Instructors: P. Clauer and D. Wise.

Animal Science 422

DAIRY CATTLE EVALUATION AND SELECTION (3). Methods used in evaluation of production and type traits and their role in selecting dairy breeding stock domestically and internationally. Prerequisite: AN SC 322. Instructors: D. R. Olver and C. D. Dechow.

Animal Science 423

COMPARATIVE PHYSIOLOGY OF DOMESTIC ANIMALS (3) A comparative approach to understanding body function in domesticated avian and mammalian species. Prerequisite: BIOL 110. Instructor: R. Ramachandran.

Animal Science 424

LIVESTOCK BREEDING EVALUATION AND SELECTION (3). Evaluation and selection of beef cattle, sheep, and swine: critical analysis of performance records and genetic evaluations. Prerequisite: AN SC 324. Instructor: D.M. Kniffen and W. Landis.

Animal Science 425

AN SC 425 (VB SC 425) PRINCIPLES OF AVIAN DISEASES (3). Principles of pathogenesis, diagnosis and control of diseases in poultry and other avian populations. Prerequisites: AN SC 201, BIOL 110, 4 credits in microbiology and 3 credits in anatomy and/or physiology. Instructor: Eva Wallner-Pendleton.

Animal Science 426

ADVANCED JUDGING AND SELECTION (2-4). Development of critical thinking and communication skills through evaluation and selection of animals and animal products. Prerequisite: AN SC 322. Instructor approval. Instructors: D. Olver, B. A. Egan, W. Landis, and D. F. Wise and P. J. Clauer.

Animal Science 427

MILK SECRETION (3). Development and physiology of the mammary gland and factors which affect the amount and composition of milk produced. Prerequisites: AN SC 201 and 3 additional credits in dairy science. Instructor: K. Harvatine and A. Macrina.

Animal Science 431W

PHYSIOLOGY OF MAMMALIAN REPRODUCTION (3) Physiological processes of reproduction in animals, including the use of current and emerging technologies. Prerequisite: 3 credits in animal physiology. Instructor: D. R. Hagen.

Animal Science 432

TECHNIQUES IN CATTLE REPRODUCTION (2). Demonstration and practice in estrus detection, inseminating techniques, pregnancy detection, embryo recovery and transfer methods. Prerequisite or concurrent: AN SC 431W. Instructor: J. M. Oatley.

Animal Science 450

DAIRY FARM MANAGEMENT SYSTEMS (3). Capstone course emphasizing integration of dairy farm management principles into whole farm systems. Prerequisites: AN SC 310, AN SC 410. Instructor: L. A. Holden.

Animal Science 457

EQUINE REPRODUCTION AND BREEDING FARM MANAGEMENT (3).

Advanced aspects of equine reproduction will be covered, including collection of semen, processing it for shipment, and insemination of mares.

Instructor: E. Jedrzejewski. Prerequisites: AN SC 327, AN SC 407.

Animal Science 467

EQUINE NUTRITION AND FEEDING (3). Equine gastrointestinal anatomy and physiology; energy and nutrient requirements for body functions; applied interrelationships between nutrition, health, and performance. Instructor: W. B. Staniar.

Prerequisites: AN SC 301, AN SC 327.

Animal Science 496

INDEPENDENT STUDIES (1-18). Creative projects or studies which are supervised on an individual basis and which fall outside the scope of formal courses. Dairy and Animal Science majors may apply a total of six credits of AN SC 496 to the total credits required for graduation.

In order to pursue an independent study, the student must contact the faculty member and reach a mutual agreement regarding the topic, number of credits and mode of conduct. The student then notifies the course coordinator regarding the agreement in order to facilitate record keeping. Any faculty member may work with any student. The coordinator serves as a focal point for communications and records. The student is required to complete a Course Proposal Form. Prerequisites: 6 credits in animal science. Coordinator: H. W. Harpster.

Animal Science 497

SPECIAL TOPICS (1-9). Formal courses offered infrequently on a topic or special interest subject. Prerequisite: 3 credits in animal science. Coordinator: H. W. Harpster.

Animal Science 499

FOREIGN STUDIES (1-12).

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SEMESTER SCHEDULE OF ANIMAL SCIENCE COURSES OFFERED

<u>AN SC Courses (credits)</u>	<u>Title</u>	<u>Semester Offered</u>
117(2)	Equine Marketing	Spring
201 (4)	Animal Science	Fall/Spring
037 (2)	Horse and Man	Fall
207 (2)	(FD SC) Animal Products Technology	Fall
208 (1)	(FD SC) Animal Products Technology Laboratory	Fall/Spring
211 (3)	Introduction to Avian Biology	Spring
213 (3)	Introduction to Animal Biotechnology	Spring
215 (3) (GS)	Pets in Society	Fall/Spring
217 (2)	Introduction to Horse Judging	Fall
290W (1)	Careers in Animal Agriculture	Fall
296 (1-18)	Independent Studies	All
297 (1-9)	Special Topics	All
300 GN (3)	Integrated Animal Biology	Spring
301 (3)	Principles of Animal Nutrition	Fall
305 (3)	Companion Animal Nutrition and Management	Fall
306 (3)	Swine Production and Management	Fall
308 (4)	Sheep and Goat Production and Management	Spring (even years)
309 (4)	Beef Cattle Production and Management	Spring
311 (4)	Poultry Production and Management	Fall
315 (3)	Small Animal Health and Disease	Spring
317 (3)	Horse Handling and Training	Spring
322 (3)	Principles of Animal Breeding	Fall
324 (3)	Value Determination of Meat Animals	Fall
327 (3)	Horse Production and Management	Fall
350 (2)	Dairy Problem Solving	Spring
395 (1-12)	Animal Science Internship	All
405 (3)	Advanced Canine Nutrition and Management	Fall
407 (3)	Advanced Horse Management	Spring
410 (4)	Advanced Dairy Herd Management	Fall
413 (3)	Transgenic Biology	Spring
414 (3)	Comparative Animal Biotechnology	Fall
417 (2)	Horse Judging	Spring
418 (3)	(AGECO and SOILS) Nutrient Management in Agricultural Systems	Fall
419W (3)	Applied Animal Welfare	Fall (even years)
420 (4)	Animal Nutrition and Feed Technology	Spring
421 (2)	Poultry Evaluation and Selection	Spring
422 (3)	Dairy Cattle Evaluation and Selection	Spring
423 (3)	Comparative Physiology of Domestic Animals	Spring
424 (3)	Livestock Breeding Evaluation and Selection	Spring
425 (3)	(VB SC) Principles of Avian Diseases	Spring (odd-numbered year)
426 (2-4)	Advanced Judging and Selection	Fall/Spring
427 (3)	Milk Secretion	Spring
431W(4)	Physiology of Mammalian Reproduction	Fall
432 (2)	Techniques in Cattle Reproduction	Fall
450 (3)	Dairy Farm Management Systems	Spring
457 (3)	Equine Reproduction and Breeding Farm Management	Fall
467(3)	Equine Nutrition and Feeding	Fall
496 (1-18)	Independent Studies	All
497 (1-9)	Special Topics	All
499 (1-12)	Foreign Studies	All

Penn State Animal Sciences Student Clubs

Department of Dairy and Animal Science
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Penn State recognizes that extracurricular activities contribute to the development of a well-rounded individual. The University provides many opportunities for entertainment, supplemental education, or involvement. Within the Penn State system there are some 400 student organizations.

BLOCK AND BRIDLE CLUB

Brief summary of activities and achievements – At the national convention in San Antonio, TX (Feb. 2009) the club was recognized as first in the nation for both Chapter Activities and Yearbook. In March 2009, for the second consecutive year, Penn State University presented the Block and Bridle Club with the Outstanding Student Organization award. In addition, the university presented the Block and Bridle Club with the Outstanding Executive Board award. Four of the major the Club conducts annually include: 1) the Fall Club Calf Show and Sale; 2) assisting with the 4-H and Collegiate Livestock Judging contests at the Keystone International Livestock Exposition; 3) managing the Pennsylvania Beef Expo which includes preparing about 100 bulls for sale, holding a beef quiz bowl, a skillathon, a showmanship demonstration, and administering all aspects of the live show; 4) Little International during which students from across the university competitively prepare and exhibit animals. Fund raising includes two auctions, sale of yearbook ads, collecting and selling bovine blood to the Philadelphia Zoo for their vampire bat colony, and receiving donations for helping with various events throughout the year. Service activities include an annual “Beef Up the Blood Supply” blood drive (one of the largest on campus), sending donations to troops overseas and Heifer International, and donating hams to during a local radio station’s “Twelve Days of Christmas” program designed to help needy families in Centre County. Advisors – Vivian Baumer, Dan Kniffen, Ken Kephart. Members – About 140 active members from multiple majors.

COLLEGIATE HORSEMEN’S ASSOCIATION AT PENN STATE (CHAPS)

Brief summary of activities and achievements – A highlight of CHAPS for the past year was hosting the American Collegiate Horsemen’s Association (ACHA) of which they are an affiliate in Harrisburg in February. Activities included an evening at Penn National Race Track with a behind the scenes tour, visits to Iron Springs Farm, New Bolton Center, Hanover Shoe Farm and the Horse World Expo. Educational presentations were provided by leaders in the Pennsylvania Equine industry. Two members of the CHAPS were elected to national office during the delegates meeting. The club continues service through local animal support organizations and assistance with a local therapeutic riding program. The club also serves as one of the sponsoring organizations for the Equine Speaker Series, providing educational presentations for students and local residents Advisor – Karen Vines. Members – About 35 active members from multiple majors.

DAIRY SCIENCE CLUB

Brief summary of activities and achievements – The Penn State Dairy Science Club is regarded as one of the nation's top organizations. For the past two years it has won the Outstanding Chapter award from the American Dairy Science Association--Student Affiliate Division (ADSA-SAD). In addition, Penn State's Dairy Science and Block and Bridle Clubs have joined forces at the Northeast ADSA-ASAS meetings to be named outstanding institution for the past four years. Major activities revolve around industry service, youth education, fundraising, and member development. The Nittany Lion Fall Classic provides members with experience in marketing and promotion, and it celebrated its 25th anniversary in 2008. Co-sponsored with the PA Holstein Association (PHA), this consignment sale offers members the opportunity to select, advertise, and sell over 70 head of high quality Holsteins. The annual holiday cheesebox sale is a major fundraising activity. Members take orders, prepare and package cheese, and make shipments to customers located in over 40 states. Proceeds from this sale and the Fall Classic are directed to the club's annual spring trip. Each year between 45-55 club members travel around the nation and world to visit outstanding dairy operations. Recent destinations have included Colorado, New Zealand, California, and Ireland. Advisors – Dale Olver and Michael O’Connor. Members – About 80 active members from multiple majors.

POULTRY SCIENCE CLUB

The Penn State Poultry Science Club is open to any student with an interest in poultry and avian species. Emphasis is placed on educational, service, and social events and activities. The two most anticipated events each year are the trip to Atlanta for the International Poultry Trade Show and College Student Career Program and the Spring Banquet. Other club activities include the fall and spring semester educational tours, community service projects (Thon, Heifer International, and Easter baskets for the Food Bank), the fresh turkey sale at Thanksgiving and the smoked turkey sale at Easter, helping at the PA Farm Show, and numerous social activities. The Poultry Science Club has been consistently recognized nationally. The Club has won the National Scrapbook of the Year competitions for eight consecutive years and has been recognized as the National Club of the Year numerous times, including 2006. Check out our web page at <http://www.clubs.psu.edu/up/psc/Default.html> for more information. The Penn State Poultry Science Club typically meets on the second and fourth Wednesday of each month at 7:00 p.m. Come join us for dinner and a guest speaker. For more information, contact Phillip J. Clauer (814-863-8960, pclauer@psu.edu) or Dirk Wise (814-863-0510, dfw3@psu.edu).

PRE-VET CLUB (sponsored by the Department of Veterinary and Biological Sciences)

The Pre-Vet Club is designed to allow students interested in veterinary medicine as a career to interact with each other, and also to provide an opportunity to gain information and experiences relevant to veterinary medicine. The club meets every other Monday evening during the regular academic year to discuss current and upcoming activities and events as well as to listen to and interact with guest speakers from veterinary schools and hospitals. Recent activities have included coordination of dog shows at the Ag Arena, medical assistance at an annual competitive equine trail ride, adoption of a wolf at a wildlife preserve, and trips to the annual American PreVeterinary Medical Association (APVMA) meeting and nearby veterinary schools. The club maintains a display case in the front lobby of the Henning Building which lists current and future activities as well as officer names and addresses. For more information, contact Dr. Lester Griel at (814) 865-7696 or lclg1@psu.edu, and Dr. David Wolfgang at (814) 863-5849 or drw12@psu.edu. Website: <http://www.clubs.psu.edu/up/prevetclub/>.

STUDENTS FOR THE RESPONSIBLE USE OF ANIMALS (SRUA)


Brief summary of activities and achievements – Pet Therapy at nursing homes- 2 to 3 times per month (3-12 students/visit, 30 different students total participated); Volunteer at T&D Cats of the World; Volunteer at Centre County PAWS- bimonthly in the fall- plan to start up again this fall. SRUA sponsored the PAWS Pet Extravaganza at the Ag Arena- volunteered, and ran booth with weight control information for pets that was student created. Advisor – Nancy Dreschel. Members – About 33 active members from multiple majors.

PENN STATE COLLEGIATE CATTLEWOMEN CLUB

Brief summary of activities and achievements – The first activity taken on by the group was third annual Meat-In Day to recognize the importance of meat in the diet. To prepare club members for talking to the public and addressing consumer issues, many of the members attended a media training provided by the PA Beef Ambassador Program. This prepared them for having a booth at Harvest to Home and Ag Awareness Days in Altoona. Advisor – Melissa Oatley. Members – 15 active members; newly formed (January, 2009).

Penn State Animal Sciences Judging Teams

Department of Dairy and Animal Science
Department of Poultry Science

PENNSSTATE
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Penn State recognizes that extracurricular competitive events contribute to the development of a well-rounded individual. The University provides many opportunities for entertainment, supplemental education, or involvement. Within the Penn State's College of Agricultural Sciences there are approximately 8 competitive teams, 5 of which have their foundation in the Animal Sciences.

DAIRY CATTLE JUDGING TEAM

The Dairy Cattle Judging Team is selected from interested students who attend practices throughout the spring and summer. Four student judges make up the Penn State team. Contest opportunities include the Eastern States Exposition, Springfield, MA; PA All-American Dairy Show, Harrisburg; and World Dairy Exposition, Madison, Wisconsin. A second team participates at the North American Livestock Exposition Contest in Louisville, KY. Intensive training sessions are held at the Maryland State Fair and at farms around the nation. Contestants place classes, give reasons, and meet students from other universities. For more information, contact Mr. Dale Olver at (814) 863-3914 or dolver@psu.edu.

EQUESTRIAN TEAM

The Penn State Equestrian Team welcomes hunt seat riders of all levels of skill and experience. The team participates in about eight horse shows a season and works toward regional and national championship shows in the spring. Attendance at team meetings is required, and members take weekly riding lessons at Eastwood Farms. For more information, call Eastwood Farms at (814) 355-4523.

HORSE JUDGING TEAM

Members of the Penn State Horse Judging Team are selected from those students who have demonstrated their ability and interest in applying the “form and function” to selection of American Quarter Horses. Students interested in the team should enroll in AN SC 417-Introduction to Horse Judging (spring) prior to enrolling in AN SC 426-Advanced Judging and Selection (fall) and competing for a position on the team. The four member team and one alternate compete at the All-American Quarter Horse Congress, Columbus, OH, and The World Quarter Horse Show in Oklahoma City, Oklahoma. Contestants place and give reasons on both halter and performance classes. Further practice in judging can be obtained in AN SC 327 and in special sessions scheduled for students interested in contest competition. For more information, contact Mr. Brian Egan (814-863-3957 or began@psu.edu).

LIVESTOCK JUDGING TEAM


The Penn State Livestock Judging Team is open to any student within the University who has a sincere interest in the improvement of meat animals utilizing modern techniques of evaluation and methods of selection. Students interested in the team should enroll in AN SC 324-Value Determination of Meat Animals (fall) and AN SC 424-Livestock Breeding, Evaluation and Selection (spring) prior to enrolling in AN SC 426-Advanced Judging and Selection (fall) and competing for a position on the team. The team of five to ten judges competes at four regional contests and two national intercollegiate contests: All-East, various universities east of the Mississippi; Eastern National, Timonium, MD; Keystone International, Harrisburg, PA; Main Event, Dayton, OH; American Royal, Kansas City, MO; and North American International at Louisville, KY. Students judge market and breeding beef cattle, sheep and swine, and provide oral reasons on selected classes. Performance records are incorporated in a variety of classes. For more information, contact Wendall Landis (814-863-0831 or wlandis@psu.edu) or Dan Kniffen (814-865-7809 or dkniffen@psu.edu).

POULTRY JUDGING TEAM

The Penn State Poultry Judging Team gives students the opportunity to attend two events per year. These poultry judging events consist of table egg quality, meat-carcass quality, breeder performance, and breed phenotype characteristics. The fall contest is held in Arkansas and the spring event takes place in Louisiana. By participating in the Poultry Judging Team, the benefit to students is four-fold: (1) provides decision analysis skills associated with genetic potential of poultry breeds; (2) provides decision analysis of poultry commodity quality (eggs/meat); (3) provides potential employer's with information about students' association with extra-curricular activities related to poultry industry; and (4) provides students with interaction among national agricultural programs and students. For more information, contact Mr. Dirk Wise at (814) 863-0510 or dfw3@psu.edu and Mr. Phillip Clauer at (814) 863-8960 or pclauer@psu.edu.

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If you are interested in any domestic animal species, this major gives you the opportunity to develop basic and applied knowledge in biological sciences, nutrition, genetics, reproduction, physiology, economics, business management, agronomy, and animal management. Depending on your interests and career goals, you can define your program of study by choosing between two options, Business/Management or Science.

The **Business/Management** option combines business and the production and management of animals and/or poultry. This option can help prepare you for careers in agribusiness/farm management, technical sales and service, cooperative extension, or commodities promotion

The **Science** option provides opportunity for more in-depth study of the basic sciences relevant to animal biology. This option can help you prepare for veterinary school, graduate study in nutrition, physiology, reproduction, or genetics, or careers in the pharmaceutical or research industries.

New and exciting courses in Animal Biotechnology, Companion Animal Science, and Equine Science can be incorporated into either option. You can also get hands-on experience with the college's herds and flocks and at the meats and research laboratories. Internships, externships, and summer employment can help you obtain a variety of work experiences. You also can take advantage of international study tours, and many Animal Sciences students participate in study abroad programs.

Why Major in Animal Sciences?

Consider majoring Animal Sciences if you

- are preparing for graduate or veterinary school
- would like a career in research relating to and/or using animals
- would like to manage a farm or business related to animals
- like to work with people in addition to animals and may be interested in a career in technical sales or service, cooperative extension, or promotions.

Career Opportunities for Animal Sciences Graduates

Employment opportunities for Animal Sciences graduates include, but are not limited to the following:

- agribusiness manager
- artificial insemination technician
- embryo transfer technician
- ag loan officer
- breed association representative
- cooperative extension
- federal meat inspector
- feed industry sales/service
- equipment sales/service
- pharmaceutical sales/service
- government agency
- insurance agent
- research and development
- livestock buyer
- marketing director
- news industry editor
- production manager
- public relations
- quality control manager
- veterinarian

For more information about this major contact:

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