Division of Animal and Nutritional Science

Programs of Study

The Division of Animal and Nutritional Sciences is home to programs in Animal & Nutritional Science, Human Nutrition & Food, and Biochemistry. The Biochemistry program is part of the Intercollegiate Undergraduate Program in Biochemistry, a collaborative effort between the Davis and Eberly Colleges. As a student in this division, you may pursue a degree that enables you to do graduate work, go into commercial agriculture, or work for federal or state agencies, the food processing industry, or other areas of food and agriculture. The pre-professional program meets requirements for entry into professional school programs of veterinary and human medicine, allied health professions, and fulfill the requirements for application to an accredited Dietetic Internship.

Courses that you will take in the division depend on a student’s particular program. The Division offers classes in animal production, biochemistry, breeding and genetics, food science, animal and human nutrition, pathology, and physiology. To assist in equipping yourself for one of the many varied careers in animal agriculture, you will take supporting courses in other divisions of the Davis College of Agriculture, Natural Resources, and Design and in other colleges. The programs are flexible and permit you to obtain a broad background and take sufficient courses in one area during the last two years to prepare you for your first postgraduate career choice.

Pre-Professional Programs (Veterinary Medicine, Human Medicine, and Allied Health Professions)

The bachelor of science programs in Animal & Nutritional Sciences, Biochemistry, and Human Nutrition & Food are designed to provide students with the academic requirements for entry into professional schools or colleges of veterinary medicine. The West Virginia Higher Education Policy Committee has agreements for positions with the schools of veterinary medicine at Mississippi State University, and at the Virginia-Maryland Regional College of Veterinary Medicine. To qualify for these positions, you must have been a West Virginia resident for at least the past five years at the time of application. Applicants for admission to these colleges of veterinary medicine must have at least seventy-eight semester hours of acceptable credit. Applicants with a grade point average of 3.0 or above will be given first consideration for admission to these institutions. Because a maximum of thirteen eligible students are accepted each year, students are urged to have alternative goals.

FACULTY

DIRECTOR

• Robert L. Taylor - Ph.D. (Mississippi State University)
  Professor - Poultry Science, Animal physiology, Immunology

PROFESSORS

• Kenneth P. Blemings - Ph.D. (University of Wisconsin)
  Assistant Director - Academic Programs, Nutritional biochemistry
• Robert A. Dailey - Ph.D. (University of Wisconsin)
  Reproductive physiology
• E. Keith Inskeep - Ph.D. (University of Wisconsin)
  Reproductive physiology
• Jacek Jaczynski - Ph.D. (Oregon State University)
  Food safety
• Jeryl C. Jones - D.V.M., Ph.D. (Auburn University)
  Veterinary radiology
• P. Brett Kenney - Ph.D. (Kansas State University)
  Animal science and meat science.
• Hillar Klandorf - Ph.D. (British Council for National Academic Awards)
  Physiology
• Joseph S. Moritz - Ph.D. (Kansas State University)
  Nutrition and feed manufacture
• Matthew E. Wilson - Ph.D. (Iowa State University)
  Reproductive Physiology

ASSOCIATE PROFESSORS

• Eugene E. Felton - Ph.D. (University of Missouri)
  Ruminant nutrition
• Marlon Knights - Ph.D. (West Virginia University)
Reproductive physiology and animal production
• K. Marie Krause - Ph.D. (University of Wisconsin)
  Dairy science nutrition
• Kristen E. Matak - Ph.D. (Virginia Tech)
  Food science and human nutrition
• Susan Partington - Ph.D., R.D. (University of Wisconsin)
  Human nutrition and foods
• Kenneth J. Semmens - Ph.D. (Auburn University)
  Aquaculture
• Janet C. L. Tou - Ph.D. (University of Toronto)
  Human nutrition and foods
• Jianbo Yao - Ph.D. (McGill University)
  Molecular biology-genetics

ASSISTANT PROFESSORS
• Kimberly M. Barnes - Ph.D. (University of Nebraska)
  Animal science-biochemistry
• Scott A. Bowdridge - Ph.D. (Virginia Tech)
  Food animal production, parasite immunology
• Melissa Marra - Ph.D., R.D. (Florida International University)
  Human nutrition and foods
• Joseph W. McFadden - Ph.D. (Virginia Tech)
  Nutritional biochemistry
• Melissa Olfert - Dr.P.H., M.S., R.D. (Loma Linda University)
  Human nutrition and foods

TEACHING ASSISTANT PROFESSOR
• Megan Govindan - M.P.H., M.S., R.D. (West Virginia University)
  Human nutrition and foods
• Crystal E. Smith - M.Agr., PAS (The Pennsylvania State University)
  Equine management

CLINICAL ASSOCIATE PROFESSOR
• Margaret A. Minch - D.V.M. (Ohio State University)
  Veterinary medicine

ADJUNCT FACULTY
• Robert L. Cochrane - Ph.D. (University of Wisconsin)
  Reproductive physiology.
• Jesse Fallon - D.V.M. (Virginia Tech)
  Veterinary medicine.
• Ann Hubb - Ph.D., D.V.M. (Colorado State University, Texas A & M)
  Veterinary medicine.
• Eric K. Johnson - Ph.D. (University of Wisconsin)
  Mechanical and aerospace engineering.
• Barbara Jean Meade - D.V.M., Ph.D., M.D. (West Virginia University)
  Veterinary sciences.
• David D. Moran - Ph.D. (University of Iowa)
  Hydrodynamics and mathematics.
• Kerry S. Odell - Ph.D. (Ohio State University)
  Agricultural education.
• Dale W. Porter - Ph.D. (West Virginia University)
  Toxicology.
• Caird E. Rexroad III - Ph.D. (Texas A&M)
  Genetics.
• George R. Seiler - D.V.M. (University of Florida)
  Veterinary sciences.
• Alfred H. Stiller - Ph.D. (University of Cincinnati)
  Chemistry.
• Richard Z. Woodworth - M.S. (West Virginia University)
  Agriculture.

FACULTY EMERITI
• William E. Collins - Ph.D. (University of Wisconsin)
  Reproductive physiology.
• Leslie Dozsa - D.V.M. (College Veterinary Medicine Budapest)
  Veterinary medicine.
• Betty J. Forbes - M.A. (West Virginia University)
  Normal, community, and clinical nutrition.
• Mary K. Head - Ph.D. (Purdue University)
  Human nutrition and foods.
• William H. Hoover - Ph.D. (Penn State University)
  Animal nutrition.
• Paul E. Lewis - Ph.D. (West Virginia University)
  Reproductive physiology.
• M. Zafar Alam Nomani - Ph.D. (Rutgers University)
  Nutrition
• Ronald A. Peterson - Ph.D. (Michigan State University)
  Nutritional physiology of poultry.
• Edward C. Prigge - Ph.D. (University of Maine)
  Animal nutrition.
• Paul M. Smith - M.S. (West Virginia University)
  Dairy foods.
• Wayne R. Wagner - Ph.D. (Colorado State University)
  Extension specialist. Animal breeding and genetics.
• John Warren - Ph.D. (University of Maryland)
  Reproductive physiology.

EQUINE STUDIES

MINOR CODE - U069

This minor is designed for students who wish to advance their knowledge of equine management practices or wish to find employment within the equine industry. Students will gain knowledge of equine management related to reproduction, nutrition, health, training methods, design of facilities, and economy of the industry.

REQUIRED COURSES

A&VS 281 Intro to Equine Care and Use 3
ANPR 344 Advanced Horse Management 4
Complete 1 of the following tracks 11-15

Management Track
A&VS 330 Equine Facility Design & Manag
ARE 421 Rural Enterprise Development
Select at least 2 of the following:
A&VS 343 Equine Hoof and Limb
ANPR 338 Horse/Livestock/Poultry Evaltn
A&VS 370 Riding Theory and Techniques
A&VS 463 Equine Events Management

Science Track
ANNU 260 Animal Nutrition
ANPH 301 Intro to Animal Physiology
ANPH 440 Equine Exercise Physiology
Select at least 2 of the following:
### A&VS 343 Equine Hoof and Limb
### ANPR 338 Horse/Livestock/Poultry Evaltn
### A&VS 370 Riding Theory and Techniques
### A&VS 497 Research

**Equine Assisted Activities and Therapies Track**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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</thead>
<tbody>
<tr>
<td>A&amp;VS 425</td>
<td>Princ of Thera Horsemanship 1</td>
</tr>
<tr>
<td>A&amp;VS 426</td>
<td>Princ of Thera Horsemanship 2</td>
</tr>
</tbody>
</table>

Select at least 2 of the following:

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>A&amp;VS 370</td>
<td>Riding Theory and Techniques</td>
</tr>
<tr>
<td>A&amp;VS 330</td>
<td>Equine Facility Design &amp; Manag</td>
</tr>
<tr>
<td>ARE 421</td>
<td>Rural Enterprise Development</td>
</tr>
<tr>
<td>DISB 380</td>
<td>Disability and the Family</td>
</tr>
<tr>
<td>DISB 482</td>
<td>Disability in the Community</td>
</tr>
<tr>
<td>PSYC 241</td>
<td>Intro to Human Development</td>
</tr>
<tr>
<td>PSYC 281</td>
<td>Intro to Abnormal Psychology</td>
</tr>
</tbody>
</table>

**Total Hours**: 18-22

*If a student wishes to become a candidate for certification to become a PATH registered level riding instructor, the minor and the following classes must be completed: A&VS 293: Riding Theory and Techniques, A&VS 491: Professional Field Experiences (Volunteerism for EAAT), and A&VS 482 Practicum - EAAT Instruct Cert.*

### FOOD SCIENCE AND TECHNOLOGY

**MINOR CODE - U057**

The minor in Food Science and Technology is for students interested in pursuing careers in the food industry. The students will gain knowledge of food processing, engineering, chemistry, microbiology, and marketing. The minor will broaden career opportunities to food safety and quality assurance, food science/technology, food engineering, sensory evaluation, new food marketing research, food development, technical sales and marketing, and state or federal food inspectors. A minimum GPA of 2.0 is required in all minor courses.

**Minor Requirements**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>FDST 200</td>
<td>Food Science and Technology</td>
<td>3</td>
</tr>
<tr>
<td>FDST 308</td>
<td>Food Plant Sanitation</td>
<td>3</td>
</tr>
<tr>
<td>ARE 431</td>
<td>Marketing Agricultural Product</td>
<td>3</td>
</tr>
</tbody>
</table>

Electives - Select three of the following:

<table>
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<tr>
<td>AEM 341</td>
<td>General Microbiology</td>
</tr>
<tr>
<td>ARE 204</td>
<td>Agribusiness Management</td>
</tr>
<tr>
<td>ARE 406</td>
<td>Applied Quantitative Methods</td>
</tr>
<tr>
<td>FDST 365</td>
<td>Muscle Foods Technology</td>
</tr>
<tr>
<td>FDST 445</td>
<td>Food Microbiology</td>
</tr>
<tr>
<td>or AEM 445</td>
<td>Food Microbiology</td>
</tr>
<tr>
<td>FDST 491</td>
<td>Professional Field Experience</td>
</tr>
<tr>
<td>HN&amp;F 171</td>
<td>Introduction to Nutrition</td>
</tr>
<tr>
<td>HN&amp;F 348</td>
<td>Science of Food Preparation</td>
</tr>
<tr>
<td>HN&amp;F 350</td>
<td>Cross-Cultural Cuisine</td>
</tr>
<tr>
<td>HN&amp;F 353</td>
<td>Food Service Systems Management</td>
</tr>
</tbody>
</table>

**Total Hours**: 18

### FOOD SERVICE PRODUCTION

**MINOR CODE - U104**

The minor in food service production is designed to provide students educational opportunities in the areas of hospitality and/or foodservice management and/or food production management. Emphasis is given to those courses that provide expanded knowledge on management, food production, and food safety. Students must obtain a 75% or higher on the ServSafe® Food Safety and Alcohol examinations offered in order to obtain the minor. A minimum GPA of 2.0 is required in all minor courses.

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</tbody>
</table>

**Total Hours**: 18
A grade of C or higher must be earned in all minor courses.

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<tr>
<th>Course</th>
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<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARE 440</td>
<td>Futures Market/Commodity Price</td>
<td>3</td>
</tr>
<tr>
<td>FDST 200</td>
<td>Food Science and Technology</td>
<td>3</td>
</tr>
<tr>
<td>FDST 445</td>
<td>Food Microbiology</td>
<td>3</td>
</tr>
<tr>
<td>HN&amp;F 353</td>
<td>Food Service Systems Management</td>
<td>4</td>
</tr>
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</table>

Choose two of the following: 6 hours

- ANPR 341 Beef Production
- ANPR 350 Milk Production
- ANPR 353 Pork Production
- ANPR 356 Small Ruminants
- ANPR 367 Poultry Production
- ARE 204 Agribusiness Management
- FDST 308 Food Plant Sanitation
- FDST 365 Muscle Foods Technology
- HN&F 348 Science of Food Preparation
- HN&F 512 Maternal & Child Nutrition

Total Hours: 19

**AGRICULTURAL BIOCHEMISTRY COURSES**

**AGBI 199. Orientation to Biochemistry. 1 Hour.**
Orientation to degree programs and requirements, departmental resources, curriculum options, student responsibilities and opportunities.

**AGBI 293A-Z. Special Topics. 1-6 Hours.**
PR: Consent. Investigation of topics not covered in regularly scheduled courses.

**AGBI 298A-Z. Honors. 1-3 Hours.**
PR: Students in Honors Program and consent by the honors director. Independent reading, study, or research.

**AGBI 393A-Z. Special Topics. 1-6 Hours.**
PR: Consent. Investigation of topics not covered in regularly scheduled courses.

**AGBI 401. Senior Seminar in Biochemistry. 1 Hour.**
PR: Senior standing in biochemistry. Students select a topic at the forefront of biochemistry and gather information on the subject and present the topic in a seminar.

**AGBI 410. Introduction to Biochemistry. 3 Hours.**
PR: 8 hours of General Chemistry and CHEM 231 or equivalent. Introduction to chemistry of cellular constituents (proteins, amino acids, carbohydrates, lipids, nucleic acids, enzymes and coenzymes) and their metabolism in animals and plants.

**AGBI 411. Intro Biochemistry Laboratory. 1 Hour.**
PR or CONC: AGBI 410. Experiments to demonstrate certain principles and properties of animal and plant biochemicals.

**AGBI 412. Intro - Biochemistry Wet Lab. 1 Hour.**
PR or CONC: AGBI 410 or Consent. Classic and modern techniques in biochemistry.

**AGBI 480. Asgn Tp: General Biochemistry. 1-4 Hours.**

**AGBI 490. Teaching Practicum. 1-3 Hours.**
PR: Consent. Teaching practice as a tutor or assistant.

**AGBI 491. Professional Field Experience. 1-18 Hours.**
PR: Consent. (May be repeated up to a maximum of 18 hours.) Prearranged experiential learning program, to be planned, supervised, and evaluated for credit by faculty and field supervisors. Involves temporary placement with public or private enterprise for professional competence development.

**AGBI 492A-Z. Directed Study. 1-3 Hours.**
Directed study, reading, and or research.

**AGBI 493A-Z. Special Topics. 1-6 Hours.**
PR: Consent. Investigation of topics not covered in regularly scheduled courses.

**AGBI 494A-Z. Seminar. 1-3 Hours.**
PR: Consent. Presentation and discussion of topics of mutual concern to students and faculty.

**AGBI 495. Independent Study. 1-6 Hours.**
Faculty-supervised study of topics not available through regular course offerings.
AGBI 496. Senior Thesis. 1-3 Hours.
PR: Consent.

AGBI 497. Research. 1-6 Hours.
Independent research projects.

AGBI 498A-Z. Honors. 1-3 Hours.
PR: Students in honors program and consent by the honors director. Independent reading, study or research.

ANIMAL NUTRITION COURSES

ANNU 260. Animal Nutrition. 3 Hours.
PR: Two courses in chemistry. Digestion and metabolism of food nutrients, nutrient requirements of farm animals, and nutritive values of feeds and rations.

ANNU 293A-Z. Special Topics. 1-6 Hours.
PR: Consent. Investigation of topics not covered in regularly scheduled courses.

ANNU 298A-Z. Honors. 1-3 Hours.
PR: Students in Honors Program and consent by the honors director. Independent reading, study, or research.

ANNU 361. Applied Nutrition 1. 3 Hours.
PR: ANNU 260. Feedstuffs, feed processing storage and additives, nutrient requirements and ration formulation for beef and dairy cattle, sheep, and horses. (2 hr. lec., 1 hr. lab.).

ANNU 362. Applied Nutrition 2. 3 Hours.
PR: ANNU 260. Applied feeding practices, nutrient requirements and ration formulation for poultry, swine, laboratory and companion animals. (2 hr. lec., 1 hr. lab.).

ANNU 393A-Z. Special Topics. 1-6 Hours.
PR: Consent. Investigation of topics not covered in regularly scheduled courses.

ANNU 490. Teaching Practicum. 1-3 Hours.
PR: Consent. Teaching practice as a tutor or assistant.

ANNU 491. Professional Field Experience. 1-18 Hours.
PR: Consent. (May be repeated up to a maximum of 18 hours.) Prearranged experiential learning program, to be planned, supervised, and evaluated for credit by faculty and field supervisors. Involves temporary placement with public or private enterprise for professional competence development.

ANNU 492A-Z. Directed Study. 1-3 Hours.
Directed study, reading, and/or research.

ANNU 493A-Z. Special Topics. 1-6 Hours.
PR: Consent. Investigation of topics not covered in regularly scheduled courses.

ANNU 494A-Z. Seminar. 1-3 Hours.
PR: Consent. Presentation and discussion of topics of mutual concern to students and faculty.

ANNU 495. Independent Study. 1-6 Hours.
Faculty supervised study of topics not available through regular course offerings.

ANNU 496. Senior Thesis. 1-3 Hours.
PR: Consent.

ANNU 497. Research. 1-6 Hours.
Independent research projects.

ANNU 498A-Z. Honors. 1-3 Hours.
PR: Students in Honors Program and consent by the honors director. Independent reading, study or research.

ANIMAL PHYSIOLOGY COURSES

ANPH 293A-Z. Special Topics. 1-6 Hours.
PR: Consent. Investigation of topics not covered in regularly scheduled courses.

ANPH 298A-Z. Honors. 1-3 Hours.
PR: Students in Honors Program and consent by the honors director. Independent reading, study, or research.

ANPH 301. Intro to Animal Physiology. 3 Hours.
PR: BIOL 102 or consent. The function and regulation of the principal systems of the animal body.

ANPH 393A-Z. Special Topics. 1-6 Hours.
PR: Consent. Investigation of topics not covered in regularly scheduled courses.
ANPH 400. Growth/Lactation Physiology. 3 Hours.
PR: ANPH 301 or consent. Animal life cycles; nature of growth and lactation; effects of biological, environmental, and social-psychological variants; physiological regulation and control.

ANPH 405. Animal Physiology Laboratory. 2 Hours.
PR: ANPH 301 or consent. Laboratory study of the physiological systems of animals and the influences of environment on these systems. (4 hr. lab.).

ANPH 424. Physiology of Reproduction. 3 Hours.
PR: Course in biology. Comparative physiology of reproduction in higher animals; endocrine functions involved in reproduction; genetic and environmental variations in fertility mechanisms.

ANPH 425. Reproductive Laboratory. 1 Hour.
PR or CONC: ANPH 424 and junior standing or consent. Laboratory study of the anatomy and function of the reproductive physiology system in animals.

ANPH 426. Applied Animal Reproduction. 1 Hour.
PR or CONC: ANPH 424 and junior standing or consent. Laboratory study, including rectal pregnancy examination, of reproductive physiology system in animals.

ANPH 430. Breeding of Farm Animals. 3 Hours.
PR: Course in genetics or consent. Application of principles of quantitative genetics to the improvement of farm animals.

ANPH 440. Equine Exercise Physiology. 3 Hours.
PR: A&VS 281 and ANPH 301. Evaluation of research in equine exercise science; physiological and mental adaptation to training; performance nutrition; unsoundness during training and competition; management and training regimes.

ANPH 480. Behavioral Patterns of Animals. 3 Hours.
PR: Consent. Teaching practice as a tutor or assistant.

ANPH 490. Teaching Practicum. 1-3 Hours.
PR: Consent. Teaching practice as a tutor or assistant.

ANPH 491. Professional Field Experience. 1-18 Hours.
PR: Consent. (May be repeated up to a maximum of 18 hours.) Prearranged experiential learning program, to be planned, supervised, and evaluated for credit by faculty and field supervisors. Involves temporary placement with public or private enterprise for professional competence development.

ANPH 492A-Z. Directed Study. 1-3 Hours.
Directed study, reading, and/or research.

ANPH 493A-Z. Special Topics. 1-6 Hours.
PR: Consent. Investigation of topics not covered in regularly scheduled courses.

ANPH 494A-Z. Seminar. 1-3 Hours.
PR: Consent. Presentation and discussion of topics of mutual concern to students and faculty.

ANPH 495. Independent Study. 1-6 Hours.
Faculty supervised study of topics not available through regular course offerings.

ANPH 496. Senior Thesis. 1-3 Hours.
PR: Consent.

ANPH 497. Research. 1-6 Hours.
Independent research projects.

ANPH 498A-Z. Honors. 1-3 Hours.
PR: Students in Honors Program and consent by the honors director. Independent reading, study or research.

ANIMAL PRODUCTION COURSES

ANPR 293A-Z. Special Topics. 1-6 Hours.
PR: Consent. Investigation of topics not covered in regularly scheduled courses.

ANPR 298A-Z. Honors. 1-3 Hours.
PR: Students in Honors Program and consent by the honors director. Independent reading, study, or research.

ANPR 308. Animal Production Experience. 1-4 Hours.
Experience in operating a dairy or livestock farm, including layers or broilers, calving, lambing, or farrowing of hogs. (Can be repeated up to a maximum of 4 credits. 3 hr. lab./ per hr. of credit.).

ANPR 336. Dairy Cattle History/Selection. 3 Hours.
To familiarize the student with the breeds of dairy cattle as well as modem concepts in phenotype and performance record evaluation. (2 labs.).

ANPR 338. Horse/Livestock/Poultry Evaltn. 3 Hours.
Appraisal of horses, cattle, sheep, poultry, and swine. Evaluation of scientific techniques used in selecting those species. Tours of representative flocks, herds and stables will be required. (Two 3 hr. labs.).
PR: FDSC 334 or ANPR 336 or ANPR 338 or consent. Advanced selection, evaluation and grading of domestic livestock species and animal products. Tours of representative flocks, herds and processing plants will be required. (Can be repeated up to a maximum of 4 credits. 3 hr. lab./per hr. credit.).  
ANPR 341. Beef Production. 3 Hours. 
PR: ANNU 260. Applying the principles of breeding, nutrition, physiology, and economics for the production of beef cattle.  
ANPR 343. Beef Production Laboratory. 1 Hour.  
CoReq: ANPR 341. Experiences in beef cattle management, including feeding, handling, health programs and farm visits. (3 hr. lab.).  
ANPR 344. Advanced Horse Management. 4 Hours.  
PR: ANNU 260. Application of breeding, nutrition, physiology, and pathology to production and management of light horses.  
ANPR 350. Milk Production. 3 Hours. 
PR: ANNU 260. Feeding and management of dairy cattle. (2 hr. lec., 3 hr. lab.) (Regional campus course requires 30 hours of work on the campus farm.).  
ANPR 353. Pork Production. 3 Hours. 
PR: ANNU 260. Physiological and economical bases of pork production. (2 hr. lec., 3 hr. lab.).  
ANPR 356. Small Ruminants. 3 Hours. 
PR: ANNU 260. Genetics, nutrition, physiology, health and management of small ruminants in production of fiber, meat and milk, in local, regional and global contexts.  
ANPR 367. Poultry Production. 3 Hours. 
PR: ANNU 260. Special phases of broiler and egg production, disease control, labor-saving studies, and recent designs in housing and equipment for all types of poultry.  
ANPR 369. Poultry Production Laboratory. 1 Hour. 
CoReq: ANPR 367. Laboratory study of poultry production systems, related feed manufacturing and product processing practices. (3 hr. lab.).  
ANPR 393A-Z. Special Topics. 1-6 Hours. 
PR: Consent. Investigation of topics not covered in regularly scheduled courses.  
ANPR 490. Teaching Practicum. 1-3 Hours. 
PR: Consent. Teaching practice as a tutor or assistant.  
ANPR 491. Professional Field Experience. 1-18 Hours. 
PR: Consent. (May be repeated up to a maximum of 18 hours.) Prearranged experiential learning program, to be planned, supervised, and evaluated for credit by faculty and field supervisors. Involves temporary placement with public or private enterprise for professional competence development.  
ANPR 492A-Z. Directed Study. 1-3 Hours.  
Directed study, reading, and/or research.  
ANPR 493A-Z. Special Topics. 1-6 Hours. 
PR: Consent. Investigation of topics not covered in regularly scheduled courses.  
ANPR 494A-Z. Seminar. 1-3 Hours. 
PR: Consent. Presentation and discussion of topics of mutual concern to students and faculty.  
ANPR 495. Independent Study. 1-6 Hours. 
Faculty supervised study of topics not available through regular course offerings.  
ANPR 496. Senior Thesis. 1-3 Hours. 
PR: Consent.  
ANPR 497. Research. 1-6 Hours. 
Independent research projects.  
ANPR 498A-Z. Honors. 1-3 Hours. 
PR: Students in Honors Program and consent by the honors director. Independent reading, study or research.  

ANIMAL AND VETERINARY SCIENCE COURSES  
A&VS 105. Professional Orientation. 2 Hours. 
PR: Freshman standing or consent. Orientation to WVU and the academic programs in the Division of Animal and Veterinary Sciences; related career and professional opportunities. Field trips required.  
A&VS 150. Intro to Animal Science. 2 Hours.  
Survey of major disciplines in animal and veterinary sciences with emphasis on related terminology; study of the development of breeds of livestock and their identification.  
A&VS 199. Orientation to Biochemistry. 1 Hour. 
Orientation to degree programs and requirements, departmental resources, curriculum options, student responsibilities and opportunities.
A comparative study of the production of meat, milk, eggs and wool. Nutrition, physiology genetics, hygiene and physical environment, and economics are discussed as bases for sound managerial decisions. (1 hr. lab.).

A&VS 275. Companion Animal Science. 3 Hours.
Basic physiology, nutrition and genetics; economic and ethical consideration of pet ownership; benefits of companion animals in society; aspects of handling and training, behavior, and common health diseases and parasite problems of pet animals.

A&VS 276. Service Dog Training. 3 Hours.
Application of current principles, theory, and practices for training service dogs.

A&VS 281. Intro to Equine Care and Use. 3 Hours.
Survey of basic equine care, breeds, use, management, and behavior with a lab in equine safety and handling.

A&VS 293A-Z. Special Topics. 1-6 Hours.
PR: Consent. Investigation of topics not covered in regularly scheduled courses.

A&VS 298A-Z. Honors. 1-3 Hours.
PR: Students in Honors Program and consent by the honors director. Independent reading, study, or research.

A&VS 330. Equine Facility Design & Manag. 3 Hours.

A&VS 343. Equine Hoof and Limb. 3 Hours.
Students in this course gain in-depth knowledge of the anatomy and physiology of the equine hoof and limb. Students will study tendons, ligaments, bones, soundness, hoof structure, shoeing principles, laminitis, and navicular disease.

A&VS 370. Riding Theory and Techniques. 3 Hours.
PR: A&VS 281. Advanced methods and techniques for performance in hunter and stock horse events; anatomical, physiological, and psychological implications; preparation of horses and riders.

A&VS 372. Careers in the Equine Industry. 3 Hours.
Provides an in-depth understanding of the careers available in the equine industry and prepares students to enter the job market.

A&VS 393A-Z. Special Topics. 1-6 Hours.
PR: Consent. Investigation of topics not covered in regularly scheduled courses.

A&VS 402. Values and Ethics - CAP. 3 Hours.
PR: Senior standing or consent. Current ethical aspects in agriculture and forestry and their impact on societal values.

A&VS 404. Career Development. 1 Hour.
Identification of career opportunities and preparation of employment applications. Development of personal skills for interviewing for employment.

A&VS 410. Calving Management. 3 Hours.
PR: Junior standing and ANNU 260. Application of current management practices for calving beef cows for early calf management and for service sire selection.

A&VS 411. Dairy Heifer Management. 3 Hours.
PR: Junior standing and ANNU 260. Application of current management practices for raising dairy calves from birth through establishment of pregnancy.

A&VS 412. Lambing Management. 1 Hour.
PR: Junior standing and ANNU 260. Application of current management practices for lambing ewes and lamb management from birth through first months of life.

A&VS 413. Camelid Physiology & Mangmnt. 3 Hours.
PR: Junior standing and ANNU 260. Application of current management practices for alpaca management.

A&VS 425. Princ of Thera Horsemanship 1. 3 Hours.
Explores the history, organization, principles, and procedures of an equine assisted activities and therapies program with the use of therapy horses for persons with disabilities.

A&VS 426. Princ of Thera Horsemanship 2. 3 Hours.
PR: A&VS 425. Expand knowledge of therapeutic horsemanship based on their learning from A&VS 425. Criteria for becoming a professional in equine assisted activities and therapy fields will be emphasized.

A&VS 435. Marketing Registered Livestock. 3 Hours.
PR: Junior standing or consent. Application of strategies for marketing animals in the registered livestock industry in West Virginia and the surrounding states.

PR: ANNU 260. Evaluation of current research in animal science; its application to production and management. Note: Previously listed as ANPR 250.

A&VS 461. Racehorse Industry Tour. 3 Hours.
Travel course designed to introduce students to the Thoroughbred and Standard-bred Racing Industries, including career opportunities and current events within it.
A&VS 462. Performance Horse Indust. Tour. 3 Hours.
Travel course designed to introduce students to the various aspects of the Performance Horse Industry, including career opportunities and current events within it.

A&VS 463. Equine Events Management. 3 Hours.
Planning, marketing, facility preparations and horse show management necessary to run a successful nationally-sanctioned equine event.

To be eligible to register in A&VS 480, the student must: (1) be in good standing, (2) obtain approval of the instructor supervising the topic, and (3) obtain approval from the instructor assigned the course responsibility.

A&VS 480A. Assigned Topics. 1-4 Hours.
To be eligible to register in A&VS 480A, the student must: (1) be in good standing, (2) obtain approval of the instructor supervising the topic, and (3) obtain approval from the instructor assigned the course responsibility.

A&VS 480B. Assigned Topics. 1-4 Hours.
To be eligible to register in A&VS 480B, the student must: (1) be in good standing, (2) obtain approval of the instructor supervising the topic, and (3) obtain approval from the instructor assigned the course responsibility.

A&VS 480C. Assigned Topics. 1-4 Hours.
To be eligible to register in A&VS 480C, the student must: (1) be in good standing, (2) obtain approval of the instructor supervising the topic, and (3) obtain approval from the instructor assigned the course responsibility.

A&VS 480D. Assigned Topics. 1-4 Hours.
To be eligible to register in A&VS 480D, the student must: (1) be in good standing, (2) obtain approval of the instructor supervising the topic, and (3) obtain approval from the instructor assigned the course responsibility.

A&VS 480E. Assigned Topics. 1-4 Hours.
To be eligible to register in A&VS 480E, the student must: (1) be in good standing, (2) obtain approval of the instructor supervising the topic, and (3) obtain approval from the instructor assigned the course responsibility.

A&VS 480F. Assigned Topics. 1-4 Hours.
To be eligible to register in A&VS 480F, the student must: (1) be in good standing, (2) obtain approval of the instructor supervising the topic, and (3) obtain approval from the instructor assigned the course responsibility.

A&VS 480G. Assigned Topics. 1-4 Hours.
To be eligible to register in A&VS 480G, the student must: (1) be in good standing, (2) obtain approval of the instructor supervising the topic, and (3) obtain approval from the instructor assigned the course responsibility.

A&VS 480H. Assigned Topics. 1-4 Hours.
To be eligible to register in A&VS 480H, the student must: (1) be in good standing, (2) obtain approval of the instructor supervising the topic, and (3) obtain approval from the instructor assigned the course responsibility.

A&VS 480I. Assigned Topics. 1-4 Hours.
To be eligible to register in A&VS 480I, the student must: (1) be in good standing, (2) obtain approval of the instructor supervising the topic, and (3) obtain approval from the instructor assigned the course responsibility.

A&VS 480J. Assigned Topics. 1-4 Hours.
To be eligible to register in A&VS 480J, the student must: (1) be in good standing, (2) obtain approval of the instructor supervising the topic, and (3) obtain approval from the instructor assigned the course responsibility.

A&VS 480K. Assigned Topics. 1-6 Hours.
To be eligible to register in A&VS 480K, the student must: (1) be in good standing, (2) obtain approval of the instructor supervising the topic, and (3) obtain approval from the instructor assigned the course responsibility.

A&VS 480L. Assigned Topics. 1-4 Hours.
To be eligible to register in A&VS 480L, the student must: (1) be in good standing, (2) obtain approval of the instructor supervising the topic, and (3) obtain approval from the instructor assigned the course responsibility.

A&VS 480M. Assigned Topics. 1-4 Hours.
To be eligible to register in A&VS 480M, the student must: (1) be in good standing, (2) obtain approval of the instructor supervising the topic, and (3) obtain approval from the instructor assigned the course responsibility.

A&VS 480N. Assigned Topics. 1-4 Hours.
To be eligible to register in A&VS 480N, the student must: (1) be in good standing, (2) obtain approval of the instructor supervising the topic, and (3) obtain approval from the instructor assigned the course responsibility.

A&VS 480O. Assigned Topics. 1-4 Hours.
To be eligible to register in A&VS 480O, the student must: (1) be in good standing, (2) obtain approval of the instructor supervising the topic, and (3) obtain approval from the instructor assigned the course responsibility.
A&VS 480P. Assigned Topics. 1-4 Hours.
To be eligible to register in A&VS 480P, the student must (1) be in good standing, (2) obtain approval of the instructor supervising the topic, and (3) obtain approval from the instructor assigned the course responsibility.

A&VS 480Q. Assigned Topics. 1-4 Hours.
To be eligible to register in A&VS 480Q, the student must (1) be in good standing, (2) obtain approval of the instructor supervising the topic, and (3) obtain approval from the instructor assigned the course responsibility.

A&VS 480R. Assigned Topics. 1-4 Hours.
To be eligible to register in A&VS 480R, the student must (1) be in good standing, (2) obtain approval of the instructor supervising the topic, and (3) obtain approval from the instructor assigned the course responsibility.

A&VS 480S. Assigned Topics. 1-4 Hours.
To be eligible to register in A&VS 480S, the student must (1) be in good standing, (2) obtain approval of the instructor supervising the topic, and (3) obtain approval from the instructor assigned the course responsibility.

A&VS 480T. Assigned Topics. 1-4 Hours.
To be eligible to register in A&VS 480T, the student must (1) be in good standing, (2) obtain approval of the instructor supervising the topic, and (3) obtain approval from the instructor assigned the course responsibility.

A&VS 480U. Assigned Topics. 1-4 Hours.
To be eligible to register in A&VS 480U, the student must (1) be in good standing, (2) obtain approval of the instructor supervising the topic, and (3) obtain approval from the instructor assigned the course responsibility.

A&VS 480V. Assigned Topics. 1-4 Hours.
To be eligible to register in A&VS 480V, the student must (1) be in good standing, (2) obtain approval of the instructor supervising the topic, and (3) obtain approval from the instructor assigned the course responsibility.

A&VS 480W. Assigned Topics. 1-4 Hours.
To be eligible to register in A&VS 480W, the student must (1) be in good standing, (2) obtain approval of the instructor supervising the topic, and (3) obtain approval from the instructor assigned the course responsibility.

A&VS 480X. Assigned Topics. 1-4 Hours.
To be eligible to register in A&VS 480X, the student must (1) be in good standing, (2) obtain approval of the instructor supervising the topic, and (3) obtain approval from the instructor assigned the course responsibility.

A&VS 480Y. Assigned Topics. 1-4 Hours.
To be eligible to register in A&VS 480Y, the student must (1) be in good standing, (2) obtain approval of the instructor supervising the topic, and (3) obtain approval from the instructor assigned the course responsibility.

A&VS 480Z. Assigned Topics. 1-4 Hours.
To be eligible to register in A&VS 480Z, the student must (1) be in good standing, (2) obtain approval of the instructor supervising the topic, and (3) obtain approval from the instructor assigned the course responsibility.

A&VS 481. Volunteerism for EAAT. 3 Hours.
Discuss and demonstrate the importance of the role of the volunteer in the equine assisted activities and therapies fields.

A&VS 482. Practicum - EAAT Instruct Cert. 3 Hours.
Prepares therapeutic riding instructors for certification within the guidelines of the Professional Association of Therapeutic Horsemanship (PATH).

A&VS 490. Teaching Practicum. 1-3 Hours.
PR: Consent. Teaching practice as a tutor or assistant.

A&VS 491. Professional Field Exper - CAP. 1-18 Hours.
PR: Consent. (May be repeated up to a maximum of 18 hours.) Prearranged experiential learning program, to be planned, supervised, and evaluated for credit by faculty and field supervisors. Involves temporary placement with public or private enterprise for professional competence development.

A&VS 492A-Z. Directed Study. 1-3 Hours.
Directed study, reading, and/or research.

A&VS 493A-Z. Special Topics. 0-6 Hours.
PR: Consent. Investigation of topics not covered in regularly scheduled courses.

A&VS 494A-Z. Seminar. 1-3 Hours.
PR: Consent. Presentation and discussion of topics of mutual concern to students and faculty.

A&VS 495. Independent Study. 1-6 Hours.
Faculty-supervised study of topics not available through regular course offerings.

A&VS 496. Senior Thesis: Capstone. 1-3 Hours.
PR: Consent.

A&VS 497. Research. 1-6 Hours.
Independent research projects.
A&VS 498A-Z. Honors. 1-3 Hours.
PR: Students in honors program and consent by the honors director. Independent reading, study or research.

A&VS 499A-Z. Global Service Learning. 3 Hours.
PR: Consent. Theory and practice of global service-learning. The main objective will be to pair the experiential aspects of meaningful and sustained service in the host community with work from the student’s anchor course by offering a methodological framework for cultural immersion and community service as well as adding to the content of the anchor course.

**FOOD SCIENCE TECHNOLOGY COURSES**

FDST 200. Food Science and Technology. 3 Hours.
Up-to-date basics of food science and technology, including; food industry outlook, degrees and careers, food chemistry, food processing and engineering, food microbiology and food safety, food biotechnology, and sensory evaluation of foods.

FDST 308. Food Plant Sanitation. 3 Hours.
PR: CHEM 111 or CHEM 115. Students will learn basic concepts of food processing and the laws and regulations governing it as well as good manufacturing practices involved in order to ensure the quality of food that is sold to the public.

FDST 365. Muscle Foods Technology. 3 Hours.
Emphasis on muscle of slaughtering, cutting, breaking, manufacturing, structure and composition, conversion of muscle to muscle food, processing food animals (cattle, sheep, hogs, poultry, and fish) and products to ensure quality and safety from processing through storage, fresh and value-added processing and nutritional value.

FDST 367. Muscle Foods Technology Lab. 1 Hour.
COREQ: FDST 365. Laboratory training in the processing of carcasses derived from food animals including red meat, poultry, and fish species. Microbiology, cookery, and storage of fresh products. Basic techniques in processed muscle foods production.

FDST 445. Food Microbiology. 3 Hours.
The relationships of microorganisms to food-borne illness and intoxications, microbial food safety and food quality, food spoilage, food preservation and bio-processing. The emerging food preservation technologies and predictive microbiology will be introduced.

FDST 449. Food Microbiology Lab. 1 Hour.
PR: FDST 445. Laboratory training in methods used in microbiological examination of foods. This laboratory will provide a hands-on experience for students who take or have taken FDST 445.

FDST 490. Teaching Practicum. 1-3 Hours.
PR: Consent. Teaching practice as a tutor or assistant.

FDST 491. Professional Field Experience. 1-18 Hours.
PR: Consent. (May be repeated up to a maximum of 18 hours.) Prearranged experiential learning program, to be planned, supervised, and evaluated for credit by faculty and field supervisors. Involves temporary placement with public or private enterprise for professional competence development.

FDST 493A-Z. Special Topics. 1-6 Hours.
PR: Consent. Investigation of topics not covered in regularly scheduled courses.

FDST 494A-Z. Seminar. 1-3 Hours.
PR: Consent. Presentation and discussion of topics of mutual concern to students and faculty.

FDST 496. Senior Thesis. 1-3 Hours.
PR: Consent.

FDST 498A-Z. Honors. 1-3 Hours.
PR: Students in Honors Program and consent by the honors director. Independent reading, study, or research.

**HUMAN NUTRITION AND FOODS COURSES**

HN&F 126. Society and Food. 3 Hours.
Exploration on a global basis of interactions of man and environment as reflected in food production systems. Relation of food supply and use in development or maintenance of social and political institutions.

HN&F 171. Introduction to Nutrition. 3 Hours.
Nutrient structure, metabolism, integrated function and their importance to human well-being during all stages of the life cycle. Current concerns and those of special interest to college students in meeting nutrient needs.

HN&F 200. Nutrition/Activity/Health. 3 Hours.
PR: HN&F 171. An overview of how proper nutrition and physical activity relates to individual health and disease prevention.

HN&F 271. Fundamentals of Nutrition. 3 Hours.
PR: HN&F 171. The occurrence, uptake and metabolic roles of essential and key non-essential nutrients will be discussed in relation to growth, reproduction, and health in human subjects.

HN&F 293A-Z. Special Topics. 1-6 Hours.
PR: Consent. Investigation of topics not covered in regularly scheduled courses.
HN&F 348. Science of Food Preparation. 3 Hours.
PR: BIOL 102 and BIOL 104 and CHEM 115. To explore functional properties of ingredients and applied scientific theories to food preparation.

HN&F 350. Cross-Cultural Cuisine. 3 Hours.
PR: Sophomore standing. This course examines the evolution of human society and culture from a historical perspective as it relates to food and cuisine. Economic and religious influences on dietary patterns and nutritional health are also explored. A hands-on laboratory emphasizes preparation of typical foods from different culture to supplement the materials covered in the lecture part of the course.

HN&F 353. Food Service Systems Management. 4 Hours.
PR: (MATH 126 or HN&F 350) and PR or CONC: AEM 341. Introduction to food service systems and systems management. Field experience in institutional and commercial food services.

HN&F 401. Senior Seminar - Nutrition-CAP. 2 Hours.
The course provides an integrative approach to various topics related to the practice of dietetics by challenging students to read, critique/evaluate, present, and discuss current research.

HN&F 460. Advanced Nutrition. 3 Hours.

HN&F 472. Community Nutrition. 3 Hours.
PR: HN&F 171. Beginning planning for community nutrition to individuals and families at various stages of the life cycle. Roles of concerned agencies and professional groups. Clinical experience in community facilities.

HN&F 473. Medical Nutrition Therapy 1. 3 Hours.
PR: HN&F 171 or consent. Nutrient analysis and introduction to nutrition experimentation; nutritional assessment.

HN&F 474. Medical Nutrition Therapy 2. 4 Hours.
PR: HN&F 473 and (PSIO 241 or PSIO 441 or ANPH 301) or consent. Nutritional care aspects of patients. Modification of diet to meet human nutrition needs in various medical conditions.

HN&F 490. Teaching Practicum. 1-3 Hours.
PR: Consent. Teaching practice as a tutor or assistant.

HN&F 491. Professional Field Experience. 1-18 Hours.
PR: Consent. (May be repeated up to a maximum of 18 hours.) Prearranged experiential learning program, to be planned, supervised, and evaluated for credit by faculty and field supervisors. Involves temporary placement with public or private enterprise for professional competence development.

HN&F 493A-Z. Special Topics. 1-6 Hours.
PR: Consent. Investigation of topics not covered in regularly scheduled courses.

HN&F 494A-Z. Seminar. 1-3 Hours.
PR: Consent. Presentation and discussion of topics of mutual concern to students and faculty.

HN&F 495. Independent Study. 1-6 Hours.
PR: Consent. Faculty supervised study of topics not available through regular course offerings.

HN&F 496. Senior Thesis. 1-3 Hours.
PR: Consent.

HN&F 498A-Z. Honors. 1-3 Hours.
PR: Students in Honors Program and consent by the honors director. Independent reading, study or research.

VETERINARY SCIENCE COURSES

VETS 293A-Z. Special Topics. 1-6 Hours.
PR: Consent. Investigation of topics not covered in regularly scheduled courses.

VETS 302. Animal Pathology. 3 Hours.
PR: ANPH 301 or consent. Diseases of farm animals with special emphasis on their cause, prevention, and control.

VETS 401. Veterinary Anatomy. 3 Hours.
PR: Junior standing or consent. Functional study of domestic and farm animal anatomy.

VETS 403. Veterinary Anatomy Laboratory. 1 Hour.
PR: Junior standing and PR or CONC: VETS 401. Gross dissection techniques used for the study of functional anatomy in domestic animals.

VETS 405. Parasitology. 3 Hours.
PR: (BIOL 101 and BIOL 102 and BIOL 103 and BIOL 104) or ( BIOL 115 and BIOL 116). Common parasites of farm animals, their life cycles, effects on the host, diagnosis, control, and public health importance. (3 hr. lec., 1 hr. lab.).
VETS 411. Principles of Lab Animal Sci. 3 Hours.
PR: Consent for undergraduates. The production, genetics, physiology, nutrition, disease and regulations of laboratory animals used in research and teaching. This course meets minimal requirements for laboratory animal technical certification programs of the American Association of Laboratory Animal Science (AALAS).

VETS 490. Teaching Practicum. 1-3 Hours.
PR: Consent. Teaching practice as a tutor or assistant.

VETS 491. Professional Field Experience. 1-18 Hours.
PR: Consent. (May be repeated up to a maximum of 18 hours.) Prearranged experiential learning program, to be planned, supervised, and evaluated for credit by faculty and field supervisors. Involves temporary placement with public or private enterprise for professional competence development.

VETS 493A-Z. Special Topics. 1-6 Hours.
PR: Consent. Investigation of topics not covered in regularly scheduled courses.

VETS 494A-Z. Seminar. 1-3 Hours.
PR: Consent. Presentation and discussion of topics of mutual concern to students and faculty.

VETS 496. Senior Thesis. 1-3 Hours.
PR: Consent.

VETS 498A-Z. Honors. 1-3 Hours.
PR: Students in Honors Program and consent by the honors director. Independent reading, study or research.