Student's Name _____ **ZOOLOGY/SCIENCE OF ANIMAL NUTRITION AG 0532**

Directions:	Evaluate the trainee using the rating scale below and check the appropriate number to indicate the degree of competency achieved. The numerical ratings of 3, 2, 1, and 0 are not intended to represent the traditional school grading system of A, B, C, D, and F. The descriptions associated with each of the tasks listed below.
Rating Scale:	**0 - No Exposure** - no information nor practice provided during training program, complete training required. **1 - Exposure Only** - general information provided with no practice time, close supervision needed and additional training required. **2 - Moderately Skilled** - has performed independently during training program, limited additional training may be required. **3 - Skilled** - can perform independently with no additional training.

1. Number of Competencies Evaluated _____
2. Number of Competencies Rated 2 or 3 _____
3. Percent of Competencies Attained (2/1) _____

_____
Grade

_____ _____
Instructor Signature Date

01.0 The Organisms
The student will be able to:

0 1 2 3		
☐☐☐☐	01.01	Outline the classification system used to identify organisms
☐☐☐☐	01.02	List the five kingdoms and describe the unique characteristics of the individuals within each kingdom
☐☐☐☐	01.03	Explain the concept: the more closely organisms are related the more similar their classification will be
☐☐☐☐	01.04	Outline the classification of the major livestock animals in the United States

02.0 Cell Structure
The student will be able to:

0 1 2 3		
☐☐☐☐	02.01	Identify the parts and organelles of the plant and animal cells
☐☐☐☐	02.02	Describe the differences between plant and animal cells
☐☐☐☐	02.03	List and describe the functions of each of the major types of specialized animal cells
☐☐☐☐	02.04	Describe the functions of the vacuole, microtubules, and microfilaments as they relate to the cell structure and support
☐☐☐☐	02.05	Explain how a cell is able to maintain a particular shape, and the nutrients that help it do so

03.0 Functions of the Cell
The student will be able to:

0 1 2 3		
☐☐☐☐	03.01	List and describe the nutrient and elemental composition of the cells protoplasm
☐☐☐☐	03.02	List the cell organelles and the functions of each part
☐☐☐☐	03.03	Trace the pathway of a glucose molecule through the cell
☐☐☐☐	03.04	Describe the process of cellular metabolism of proteins, fats, and complex carbohydrates
☐☐☐☐	03.05	Describe the process of cellular respiration and list the products produced

04.0 Animal Tissues
The student will be able to:

0 1 2 3		
☐☐☐☐	04.01	Describe how specialized cells are organized to form a tissue type
☐☐☐☐	04.02	List and describe the six types of specialized animal tissues and their individual functions

05.0 Animal Organs and Systems
The student will be able to:

0 1 2 3		
☐☐☐☐	05.01	List the eight systems of animals and the major organs that make up each system
☐☐☐☐	05.02	Explain the functions of each of the eight systems

06.0 Introduction to Animal Nutrition

The student will be able to:

0 1 2 3		
☐☐☐☐	06.01	List the major functions of animals in human society
☐☐☐☐	06.02	List the eight major animal sources of food in the world and approximately what percent of the total does each supply
☐☐☐☐	06.03	Describe the use of animal power in the world today
☐☐☐☐	06.04	Compare the relative efficiencies of the major farm animals in converting feed to protein and energy for human consumption
☐☐☐☐	06.05	Explain why the livestock industry adds to the human food base rather than decreasing it
☐☐☐☐	06.06	Describe how animals are important in providing clothing for human use
☐☐☐☐	06.07	Describe the importance of livestock production in the total agricultural industry in the United States
☐☐☐☐	06.08	List, define, and give examples of the two major feed groups generally used in livestock feeding
☐☐☐☐	06.09	List the six components of feed that are important when balancing rations for livestock
☐☐☐☐	06.10	List the feed components that provide energy for animals
☐☐☐☐	06.11	List the major minerals needed in livestock rations
☐☐☐☐	06.12	Identify the factors that affect the water intake of animals
☐☐☐☐	06.13	Explain why feed additives are used in livestock rations
☐☐☐☐	06.14	List some important byproducts of the livestock industry
☐☐☐☐	06.15	Describe the use of animal power in the world today

07.0 Digestion in Animals

The student will be able to:

0 1 2 3		
☐☐☐☐	07.01	Define the terms associated with animal digestion
☐☐☐☐	07.02	Name the three kinds of digestive systems and give an example of the animals with each type
☐☐☐☐	07.03	List the parts of the monogastric digestive system and describe the function of each
☐☐☐☐	07.04	Match the digestive enzymes with their function
☐☐☐☐	07.05	Describe the function of the liver
☐☐☐☐	07.06	Describe the difference between the digestive system of the horse and the swine
☐☐☐☐	07.07	List the four major compartments of the stomach of the ruminant and describe the function of each
0 1 2 3		
☐☐☐☐	07.08	Describe regurgitation in the ruminant and tell how it relates to the digestive process
☐☐☐☐	07.09	List the major microorganisms found in the rumen and describe their function
☐☐☐☐	07.10	List the parts of the avian digestive system and describe the functions of each
☐☐☐☐	07.11	Describe the process of absorption
☐☐☐☐	07.12	Describe the process of metabolism

08.0 Energy Nutrients

The student will be able to:

0 1 2 3		
☐☐☐☐	08.01	Define terms associated with energy
☐☐☐☐	08.02	Describe each of the six energy nutrients
☐☐☐☐	08.03	List the sources of energy nutrients
☐☐☐☐	08.04	Describe the functions of the energy nutrients
☐☐☐☐	08.05	Describe the symptoms of energy deficiencies in the ration
☐☐☐☐	08.06	Explain the term critical temperature and how it is important in livestock management
☐☐☐☐	08.07	Describe the energy needs of animals for milk production, pregnancy, and work
☐☐☐☐	08.08	List the three nutrients that are the major sources of energy in livestock rations
☐☐☐☐	08.09	Name the most important nutrient and explain why it is the most important
☐☐☐☐	08.10	List the carbohydrates that are the most easily digested, and those that are the hardest to digest
☐☐☐☐	08.11	List the most important compound sugars in the animals body
☐☐☐☐	08.12	Identify the parts of the plant that store the most easily digested carbohydrates
☐☐☐☐	08.13	Describe the digestion of fiber
☐☐☐☐	08.14	Compare the amount of energy supplied by fats and oils as compared to carbohydrates
☐☐☐☐	08.15	List three essential fatty acids

09.0 Protein

The student will be able to:

0 1 2 3		
☐☐☐☐	09.01	Define the term protein and the terms associated with it.
☐☐☐☐	09.02	List the common sources of protein
☐☐☐☐	09.03	Describe the function of protein
0 1 2 3		

☐☐☐☐ 09.04 Describe the symptoms of protein toxicity
☐☐☐☐ 09.05 Discuss and describe the use of nonprotein nitrogen sources
☐☐☐☐ 09.06 Identify the part of the plant in which most of the protein is stored
☐☐☐☐ 09.07 Describe digestible protein
☐☐☐☐ 09.08 Explain the difference between essential and nonessential amino acids
☐☐☐☐ 09.09 Explain what is meant by the quality of protein
☐☐☐☐ 09.10 Describe protein quality as it relates to formulating rations for ruminant and nonruminant animals
☐☐☐☐ 09.11 Identify at what stages of the animal's life the protein requirements are the greatest
☐☐☐☐ 09.12 Explain the relationship between protein deficiency and energy nutrition
☐☐☐☐ 09.13 Explain what causes protein in a ration to be available
☐☐☐☐ 09.14 Describe the biological value of protein

10.0 Minerals

The student will be able to:

0 1 2 3

☐☐☐☐ 10.01 Describe minerals used in animal nutrition
☐☐☐☐ 10.02 List the sources of minerals for animal nutrition
☐☐☐☐ 10.03 Describe the functions of minerals in animal nutrition
☐☐☐☐ 10.04 Describe the deficiency symptoms caused by the lack of minerals in the ration
☐☐☐☐ 10.05 Describe the toxicity symptoms cause by specific minerals
☐☐☐☐ 10.06 Discuss the mineral requirements needed in a balanced ration
☐☐☐☐ 10.07 List the major minerals needed by livestock
☐☐☐☐ 10.08 List the trace minerals needed by livestock
☐☐☐☐ 10.09 List the minerals that are most likely to be deficient in livestock feeding
☐☐☐☐ 10.10 Describe the common way to add trace minerals to the livestock ration

11.0 Vitamins, Feed Additives, and Water

The student will be able to:

0 1 2 3

☐☐☐☐ 11.01 Describe vitamins and feed additives
☐☐☐☐ 11.02 List the sources of vitamins and feed additives
☐☐☐☐ 11.03 List the vitamins that are essential in animal nutrition
☐☐☐☐ 11.04 List the chemical elements that are found in vitamins

0 1 2 3

☐☐☐☐ 11.05 List the vitamins that are soluble in water and which are soluble in fat or fat solvents
☐☐☐☐ 11.06 List the vitamins that are commonly synthesized in the rumen
☐☐☐☐ 11.07 Explain how the solubility of vitamins affects the need for supplying them in the diet
☐☐☐☐ 11.08 Describe how vitamins may be supplied other than through natural feed sources
☐☐☐☐ 11.09 Describe the functions of vitamins/feed additives and water
☐☐☐☐ 11.10 Describe the deficiency symptoms caused by the lack of each of the vitamins in a ration
☐☐☐☐ 11.11 Discuss the relationship between age and fat content of the body and the percent of water it contains
☐☐☐☐ 11.12 In addition to drinking water, list the other sources of water for the animal
☐☐☐☐ 11.13 List and discuss factors affecting the amount of water an animal will consume
☐☐☐☐ 11.14 List the typical water intakes for various classes of livestock
☐☐☐☐ 11.15 Describe the ways by which animals lose water from the body
☐☐☐☐ 11.16 List the symptoms of water deprivation in livestock
☐☐☐☐ 11.17 Discuss the effects of feed additives in the ration
☐☐☐☐ 11.18 Describe the regulations on the use of feed additives in the ration

12.0 Classification and Use of Feeds

The student will be able to:

0 1 2 3

☐☐☐☐ 12.01 List and briefly tell the difference between the two general classes of feeds used for animal nutrition
☐☐☐☐ 12.02 List the eight descriptors used in determining International Feed Names
☐☐☐☐ 12.03 List and briefly describe each of the eight feed classes
☐☐☐☐ 12.04 Identify the class of livestock that are fed urea and other nonprotein nitrogen sources
☐☐☐☐ 12.05 Describe how nutrition affects reproduction in livestock
☐☐☐☐ 12.06 Describe nutrient needs of young, growing animals as compared to more mature animals
☐☐☐☐ 12.07 Explain why a maintenance ration requires a certain amount of the total feed consumed by an animal
☐☐☐☐ 12.08 Describe the life processes that are supported by a maintenance ration

0 1 2 3

☐☐☐☐ 12.09 Explain why the amount of an animal's body surface is more closely related to its maintenance needs than is its weight

☐☐☐☐ 12.10 Explain how milk production affects the nutrient requirements of an animal

☐☐☐☐ 12.11 Explain how wool and mohair production affects the nutrient requirements of sheep and goats

☐☐☐☐ 12.12 Describe the effect of work on nutrient requirements of horses

13.0 Nutrient Quality and Analysis

The student will be able to:

0 1 2 3

☐☐☐☐ 13.01 List and describe the factors that affect feed quality

☐☐☐☐ 13.02 List the six components into which a feedstuff is separated by proximate analysis

☐☐☐☐ 13.03 Describe the method of proximate analysis for each of these six components

☐☐☐☐ 13.04 List the limitations of using proximate analysis to determine feed value

☐☐☐☐ 13.05 Describe and give examples of how feeds may be converted from one composition basis to another

☐☐☐☐ 13.06 Explain why the Van Soest method of forage analysis is sometimes used

☐☐☐☐ 13.07 Describe the Van Soest method of forage analysis

☐☐☐☐ 13.08 Explain why digestion trials are of importance when determining the value of a feedstuff

☐☐☐☐ 13.09 Describe how net energy values of feed may be determined

☐☐☐☐ 13.10 List and briefly describe some other measures of feed value

☐☐☐☐ 13.11 Explain why feeding trials are of value in developing rations

☐☐☐☐ 13.12 Describe the major provisions found in most state feed laws

14.0 Metabolism of Nutrients for Maintenance, Health and Production

The student will be able to:

0 1 2 3

☐☐☐☐ 14.01 Define the terms associated with this unit

☐☐☐☐ 14.02 Explain why a balanced ration is important in livestock feeding

☐☐☐☐ 14.03 Describe the general principles for formulating a ration

☐☐☐☐ 14.04 Describe the general principles for ration selection

☐☐☐☐ 14.05 Describe the steps in balancing a ration

☐☐☐☐ 14.06 Use feeding standards and feed composition tables to help balance a ration

0 1 2 3

☐☐☐☐ 14.07 Use the Pearson Square or algebraic equations to balance rations

☐☐☐☐ 14.08 Discuss the use of computers to balance rations

☐☐☐☐ 14.09 Describe how urea should used as a protein supplement in ruminants to achieve maximum benefits, without causing harm to the animal

☐☐☐☐ 14.10 Discuss the proper use of growth stimulants and the role they play in the animals development

☐☐☐☐ 14.11 Describe the relationship between proper nutrition and the essential elements and nutrients that compose the cells protoplasm

15.0 Environment and Nutrition

The student will be able to:

0 1 2 3

☐☐☐☐ 15.01 Define the term effective ambient temperature

☐☐☐☐ 15.02 Describe how animals maintain body heat balance

☐☐☐☐ 15.03 Define the term thermoneutral zone

☐☐☐☐ 15.04 Define the terms upper critical temperature and lower critical temperature and discuss their significance for livestock producers

☐☐☐☐ 15.05 Explain why large ruminants have lower critical temperatures than other farm animals

☐☐☐☐ 15.06 Explain how animals generally react when they pass the upper critical temperature

☐☐☐☐ 15.07 Discuss the effects of temperature on forage quality and intake

☐☐☐☐ 15.08 List the three major sources of water for livestock

☐☐☐☐ 15.09 List three major ways livestock lose water

☐☐☐☐ 15.10 Describe the effect temperature has on iced efficiency

☐☐☐☐ 15.11 Explain why the efficiency of egg production increase during periods of high temperature

☐☐☐☐ 15.12 Explain what adjustments in diet may be beneficial when temperatures are above or below the thermoneutral zone

16.0 Relationship Between Nutrition and Animal Products

The student will be able to:

0 1 2 3

☐☐☐☐ 16.01 Describe the effects of animal nutrition on the composition of milk, meat and eggs

☐☐☐☐ 16.02 Describe the effects of over and under feeding on the composition of animal products

☐☐☐☐ 16.03 Describe the importance of protein quality on muscle and fiber composition

0 1 2 3

☐☐☐☐ 16.04 Describe the role vitamins and minerals play in the composition of

animal products

☐☐☐☐ 16.05 Describe the effect that certain by-products have on animal products when included in the diet (ex. fish meal when fed to swine)

☐☐☐☐ 16.06 Explain the importance of proper nutrition in the laying hen as related to egg shell quality and yolk composition

☐☐☐☐ 16.07 Describe the importance of proper nutrition for milk production

☐☐☐☐ 16.08 Describe the importance of proper nutrition on the composition of milk

☐☐☐☐ 16.09 Explain the effects of feed odors on animal product quality

17.0 Relationship Between Nutrition and Reproduction

The student will be able to:

0 1 2 3

☐☐☐☐ 17.01 Describe the reproductive benefits which are derived from flushing, and the rations that are needed to derive these benefits

☐☐☐☐ 17.02 Describe the reproductive problems encountered from deficient nutritional levels

☐☐☐☐ 17.03 Describe the reproductive problems that result from over feeding

☐☐☐☐ 17.04 Describe the role of minerals in the reproductive process

☐☐☐☐ 17.05 Describe how the nutrient levels required for reproduction change as each animal species proceeds through pregnancy

☐☐☐☐ 17.06 Describe the differences in nutrient requirements between growing and mature animals as related to reproductive efficiency

☐☐☐☐ 17.07 Indicate the most critical nutrient for lactating animals

☐☐☐☐ 17.08 Indicate the minimum level of fiber needed in the ration of lactating dairy cows and why is it needed

☐☐☐☐ 17.09 Describe how proper nutrition during pregnancy will prevent postpartum diseases and ailments in the offspring

☐☐☐☐ 17.10 Describe the role of antibiotics in animal rations during gestation

☐☐☐☐ 17.11 Describe how sires should be fed for best reproductive performance

☐☐☐☐ 17.12 Describe all the nutrient requirements associated with lactation

☐☐☐☐ 17.13 Describe the importance of the calcium-phosphorous ratio to reproductive performance

☐☐☐☐ 17.14 List the recommended protein and energy requirements for pullets and hens of the egg laying species