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 numbers focus on level of student performance for 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.

01.0 The Organisms
The student will be able to:

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:

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:

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:

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:

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:

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:

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

08.0 Energy Nutrients

The student will be able to:

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:

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
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 caused 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
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 Discuss 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
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:

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:

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

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 be 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 animal's 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:

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 effects of 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:

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

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

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