I. OVERVIEW
The following information will appear in the 2012 - 2013 catalog

ANSC 224  Dairy Feeds & Feeding  3 Units

Fundamentals of nutrient digestion and absorption in ruminants. The nutritive value of feeds as they relate to the formulation of dairy rations will be emphasized with the inclusion of various plant tissue commodities by-product feeding. Term project and field laboratories required.

Field trips are required.  (A-F Only) Lecture /Lab
Transfer: (CSU)

II. LEARNING CONTEXT
Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goals specified in Section III, Desired Learning:

A. COURSE CONTENT

1. Required Content:

   a. Concepts of nutrition
      i. Historical advancements in dairy nutrition
      ii. Dairy nutrition and its role in society
      iii. Importance of proper dairy nutrition
      iv. Principles of the scientific method

   b. Feed analysis and source
      i. Protein
      ii. Carbohydrates
      iii. Fats
      iv. Vitamins
      v. Minerals
      vi. Water

   c. Dairy animal growth, composition and variability
      i. Water
      ii. Energy
      iii. Proteins
iv. Inorganic elements

v. Vitamins

d. Gastrointestinal tract
   i. Types of gastrointestinal tracts
   ii. Role of gastrointestinal secretions in the digestive process
   iii. Digestion and absorption
   iv. Transport of nutrients after metabolism
   v. Fecal and urinary excretions

e. Nutrient metabolism
   i. Maintenance, growth, fattening, reproduction and milk production
   ii. Water
   iii. Carbohydrates
   iv. Lipids
   v. Proteins and amino acids
   vi. Inorganic materials
   vii. Vitamins

f. Applied dairy nutrition
   i. Feeding standards and productivity
   ii. Feedstuffs
   iii. Preparation and processing
   iv. Ration formulations
   v. Non-caloric performance enhancers

g. Daily feeding practices
   i. Calves
   ii. Young heifers
   iii. Bred heifers
   iv. Lactating cows
   v. Dry cows
   vi. Bulls

2. **Required Lab Content:**
a. Procedures to weigh and measure heifers, score body condition, and evaluate growth trends to known acceptable values.

b. Identification by sight and smell the various commodities used to feed dairy cattle and understand their classification, economic value, and numeric nutritional values.

c. Identification of various types of forage, determine the observed quality levels, particle size and distribution, and rank the forages from high to low, explaining why.

d. Attendance at field trips to feed mills, firms conducting analytical evaluations of feeds, and dairies to see how feed is processed, scored, and consumed by cattle

e. Participation in laboratories with instruction in basic metabolism, digestion and absorption to further understand the importance of particle size, density, and moisture content.

f. Calculation of the net energy requirement for milking cows and heifers, meeting the needs for production, growth and maintenance.

g. Balance of various rations for all the nutritive needs of high production cows and growthy heifers while maintaining the proper calcium-phosphorous ratios.

B. HOURS AND UNITS

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C. METHODS OF INSTRUCTION (TYPICAL)

Instructors of the course might conduct the course using the following method:

1. Lecture
2. Discussion
3. Demonstration
4. Use of audio-visual materials including “virtual tours” on CD, website research and analysis
5. Field trips, feed trials and balancing rations.
6. Classroom discussion and analysis of the course textbook readings
7. Presentations by industry specialists.

D. ASSIGNMENTS (TYPICAL)

1. EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS

Time spent on coursework in addition to hours of instruction (lecture hours)

a. Weekly reading assignments
b. Periodic article review reports
c. Weekly glossary words
d. Preparation and development of balanced rations
2. **EVIDENCE OF CRITICAL THINKING**

   *Assignments require the appropriate level of critical thinking*

   a. After participating in various laboratories and developing an understanding of the nutritive values relative to feeds, the student will build a balanced, palatable, economic and production maintaining ration that will meet the needs for maintenance, growth, production and reproduction of a high production dairy cow.

   b. After listening and watching a presentation about rumen development, observing several samples of rumen tissues, and reading suggested articles, the student will be able to dissect a freshly processed bovine rumen and determine the development stage of the rumen. The student will also be able to identify, using scientific methods, various microbes, measure micro-flora concentrations, pH and particle size.

   c. Prepare a comprehensive laboratory notebook which includes critical analysis, conclusion, and summary of all weekly laboratory activities.

E. **TEXTS AND OTHER READINGS (TYPICAL)**


   3. **Other:** Hoard’s Dairyman (periodical)

III. **DESIRED LEARNING**

   A. **COURSE GOAL**

   *As a result of satisfactory completion of this course, the student should be prepared to:*

   demonstrate in a semester long lab notebook attributes conducive to profitable dairy production in the areas of nutritional concepts, feed analysis, sources of feed stuffs, growth & lactation requirements, body condition scoring relative to herd health, proper gastrointestinal tract requirements, nutrient metabolism, applied dairy nutrition, and common dairy feeding practices. Students will also be able to answer questions on the above topics presented in lab and/or lecture at a success rate of 70% or higher.

   B. **STUDENT LEARNING GOALS**

   *Mastery of the following learning goals will enable the student to achieve the overall course goal.*

   1. **Required Learning Goals**

   *Upon satisfactory completion of this course, the student will be able to:*

   a. Identify requirements and potential opportunities that will lead to a career in the area of dairy nutrition.

   b. Identify cultural inputs that have shaped the dairy nutrition industry.

   c. Apply changing nutritional requirements based upon animal physiological development.

   d. Identify differences in the digestive anatomy of the dairy animals that may dictate feeding practices based on age and/or rumen development.

   e. Identify the major parts of the ruminant gastrointestinal track including the accessory organs involved with the ruminant digestive process.

   f. Analyze the principles of ruminant digestion, absorption and assimilation of feeds.
g. Explain in a verbal and written format the role of nutrition in dairy animal health and food safety.

h. Identify common commodities used in dairy cattle feeding and have knowledge of the nutritive value of those feeds.

i. Identify quality feeds and calculate their relative value.

j. Use the scientific method to collect and calculate data used in dairy cattle ration formulation.

k. Formulate dairy cattle rations with economic feasibility.

l. Identify various primary and by-product feeds, forms and processing techniques used in dairy cattle feeding.

m. Evaluate economic factors and trends in feeding dairy cattle.

2. Lab Learning Goals

Upon satisfactory completion of the lab portion of this course, the student will be able to:

a. Nutritionally balance a ration for NEL, protein, Ca, P, and TDN to maintain production and BCS for a variety of sizes, production levels, and breeds of dairy cows.

b. Identify the various parts of the gastrointestinal tract and the functions of each in maintaining health and high production.

c. Identify and justify at least 15 different feeds discussed in class that can be used to balance completely a dairy ration.

d. Discuss and explain the daily biological and environmental needs of a high production dairy cow.

IV. METHODS OF ASSESSMENT (TYPICAL)

A. FORMATIVE ASSESSMENT

1. Lecture and laboratory examinations.

2. Written assignments.

3. Laboratory notebook and weekly laboratory reports.

4. Participation in hands-on laboratory activities utilizing the scientific method.

5. Quizzes and unit exams.


7. Midterm exam

B. SUMMATIVE ASSESSMENT

1. Final exam

2. Laboratory participation, skills and projects

3. Group and individual field projects