NORTHWESTERN POLYTECHNIC

SCHOOL OF APPLIED SCIENCE AND TECHNOLOGY
ANIMAL HEALTH TECHNOLOGY

COURSE OUTLINE – Winter 2023

AH244 Nutrition – 2.5 (3-0-0) 48 Hours for 16 Weeks

Northwestern Polytechnic (NWP) acknowledges that our campuses are located on Treaty 8 territory, the ancestral and present-day home to many diverse First Nations, Metis, and Inuit people. We are grateful to work, live and learn on the traditional territory of Duncan's First Nation, Horse Lake First Nation and Sturgeon Lake Cree Nation, who are the original caretakers of this land.

We acknowledge the history of this land and we are thankful for the opportunity to walk together in friendship, where we will encourage and promote positive change for present and future generations.

INSTRUCTOR:	Dr. Chris Mizzi	**PHONE:**	780-835-6617
OFFICE:	AS133	**E-MAIL:**	cmizzi@nwpolytech.ca
OFFICE HOURS:	As posted		

CALENDAR DESCRIPTION:

Instruction on basic nutritional requirements, nutrients, additives and preservatives is given. Variations in nutritional considerations for different physiological conditions and for small and large animals are discussed. Normal rations and indications for prescription or specialty diets will be identified. The student will learn to make recommendations to clients and educate them as to their animal's particular needs.

PREREQUISITE(S)/COREQUISITE:

- Must be registered in the NWP Animal Health Technology Program
- AH172, AH173

REQUIRED TEXT/RESOURCE MATERIALS:

Course Notes

DELIVERY MODE(S):

High Flex. This course is delivered in-person and may be lectured remotely via Zoom. Quizzes, Midterm and final exams will occur in-person. Students must have a computer with a webcam and reliable internet connection. Technological support is available through helpdesk@nwpolytech.ca.

COURSE OBJECTIVES/LEARNING OUTCOMES:

A. Module 1: Digestive Systems – At the end of this unit the student will be able to:

1. Define the terms nutrition, heterotrophy, autotroph, ingredient, metabolism, catabolism and anabolism
2. Define the term nutrient and give the six different classes
3. Define and discuss energy
4. Know the classification and function of different digestive systems
5. Describe the major components and functions of the digestive system
   --From mouth to anus
6. Know the differences between ruminant digestion and monogastric digestion
7. Know the different enzymes and secretions used in digestion
8. Describe and label the function of each of the compartments of the ruminant and monogastric stomach
9. Describe rumination including the steps of rumination
10. Describe the function of the pancreas and liver in digestion

B. Module 2: Nutrients – At the end of this unit the student will be able to:

1. Briefly describe the processes of simple diffusion, osmosis, active transport, and pinocytosis
2. List 6 functions of water in the body
3. Describe sources and losses of water from the body
4. Discuss factors affecting water intake
5. Describe the chemical makeup of carbohydrates
6. Describe the major role of carbohydrates in animal nutrition and other functions
7. Define the terms monosaccharide, disaccharide and polysaccharide and the bonds involved
8. Know common monosaccharides and disaccharides.
9. Discuss soluble and insoluble dietary fiber
10. Describe differences between starch and cellulose
11. Describe the process of and differences between ruminant, monogastric and cecant digestion of carbohydrates.

12. Define what a "VFA" is and list the three types produced during the fermentation process
13. Discuss deficiencies and toxicities of carbohydrates
14. Describe the function of fat in animal's diet
15. In general terms describe the structure of a lipid
16. Define the term triglyceride
17. List and explain the effect of two factors that influence the physical form of lipids at room temperature
18. Discuss essential fatty acids in domestic animals
19. Contrast the process of fat digestion in the ruminant to that in the non-ruminant
20. Give signs of toxicity and deficiency of Fatty Acids
21. Describe the structure of amino acids and protein and the bonds that hold them together
22. Define an essential amino acid and know the common ones
23. Explain the concept of a first limiting amino acid
24. Know the functions of protein
25. Discuss protein digestion and absorption in the monogastric and the ruminant
26. Explain the importance of colostrum to the newborn animal and how it is digested and absorbed
27. Discuss deficiency and toxicity of proteins
28. Name the two classes of vitamins in animal nutrition and know which vitamins are in each class
29. Know the differences between fat soluble and water-soluble vitamins
30. Know the roles of vitamin A in the body
31. Explain where Vitamin A comes from and how it is used in the body
32. List the symptoms of vitamin A deficiency and toxicity
33. Describe the principle role of vitamin D in the body and know what the common forms of Vit D are
34. Know the symptoms of Vit D toxicity and deficiency
35. Know common sources of Vit D and how it is utilized in the body
36. Describe the function of vitamin E
37. Know the signs of Vitamin E deficiency and toxicity
38. Describe the function of vitamin K
39. Describe the symptoms of Vitamin K deficiency
40. Explain why monogastrics are more likely to suffer from a water-soluble vitamin deficiency than ruminants or cecants
41. Explain why toxicity is less of a concern with water-soluble vitamins

42. For each of the water-soluble vitamins, list their main function and symptoms of deficiency
43. List the general roles that minerals play in the body
44. For each mineral, know common sources and signs of deficiency and toxicity
45. Identify all of the minerals from their 1 or 2-letter chemical abbreviation
46. Classify minerals as either macro- or micro-minerals
47. Discuss the Ca:P ratio

C. Module 3: Nutrient Requirements for body function – At the end of this unit the student will be able to:

1. Know the different types of energy in the diet.
2. Discuss the difference between BER, RER, MER and DER.
3. List and describe the factors that influence an animal's energy requirements
4. Briefly describe the interaction between body size and climate
5. Explain why growth is so important to livestock producers
6. Briefly explain how composition of weight gain changes during the growth phase of an animal
7. Briefly explain the concept of compensatory growth
8. Define the terms "average daily gain", "feed conversion efficiency", and "feed-to-gain ratio"
9. Discuss the importance of good nutrition to reproduction
10. Define flush-feeding and briefly describe its purpose
11. List 6 common causes of nutritionally-related reproductive failure in breeding animals
12. Put the biological functions requiring nutrients in order from highest priority to lowest priority

D. Module 4: Control of Feed Intake in Animals – At the end of this unit the student will be able to:

1. Explain the difference between "hunger" and "appetite"
2. List a common term utilized instead of appetite, in animal science?
3. List and discuss the two centers in the hypothalamus that interact to control feed intake
4. List and briefly explain the 2 theories that have been proposed to explain how the hypothalamus influences feed intake
5. List and explain 7 additional factors that influence VFI in livestock

E. Module 5: Important Concepts in Nutrition Metabolism – At the end of this unit the student will be able to:

1. Explain why digestibility of a feed is important from the standpoint of animal nutrition
2. List and explain the factors that influence the digestibility of an animal's diet
3. Explain how the crude protein measurement and the true protein content of a feed are not the same thing
4. Define Calorie
5. Explain the common terms used in energy requirements
6. Define heat increment and Net Energy
7. List 2 factors that increase heat increment of a feed and 1 factor that lowers the heat increment of a feed

F. Module 6: Body Condition Scoring – At the end of this unit the student will be able to:

1. List the basic purpose of body condition scoring livestock
2. Briefly describe the principle behind body condition scoring
3. List the key anatomical landmarks that should be examined during the body condition scoring process for a) cattle, b) sheep, c) horses, d) pigs, e) small animals
4. List the consequences of having animals that are under-conditioned or over-conditioned

G. Module 7: Common Feeds for Livestock – At the end of this unit the student will be able to:

1. Describe general characteristics of forages
2. Discuss how the amount and type of fiber in a forage plant changes with age
3. Know the benefits of pasture feeding vs preserved forages (hay)
4. Explain how legumes differ from other forages
5. Define the term hay and discuss how to evaluate the nutritional quality of hay.
6. Explain how silage and haylage are made
7. Discuss advantages and disadvantages of feeding silage to livestock
8. List and discuss the factors that have the greatest influence on the energy value of feed
9. Know the differences in protein, fiber and energy between all energy supplements
10. List the two main classes or sources of protein supplements
11. List the major plant protein sources and the relative amounts of protein of each
12. Explain why in Canada it is illegal to feed meat meal derived from a ruminant back to a ruminant

13. List common animal protein sources
14. List and explain considerations that should be remembered when considering the use of an animal protein supplement

H. Module 8: Feed Sampling – At the end of this unit the student will be able to:
1. Describe the procedure for sampling from a) pastures b) hay bales c) silage pits d) feed bins and d) feed bags

I. Module 9: Anti-nutritional Factors and Toxins in Feed – At the end of this unit the student will be able to:
1. List and briefly describe the anti-nutritional effect, symptoms and feeds that are most affected by: a) lectins, b) tannins, c) oxalates and phytate, d) trypsin inhibitor, e) glucosinolates, and f) nitrates
2. List the conditions that promote the infection of crops with molds
3. Link the respective mycotoxin with the organism that produces it
4. Identify the major symptoms associated with each of the mycotoxin
5. Identify the crops that are most susceptible to infection by the causative organism
6. List the main recommendation for dealing with mycotoxin infected feed

J. Module 10: Feed Additives – At the end of this unit the student will be able to:
1. List 3 reasons feed additives are included in many animal feeds
2. Describe the role of each class or sub-class of feed additive discussed
3. Provide an example for each class or sub-class of feed additive

K. Module 11: Nutrition Related Disorders – At the end of this unit the student will be able to:
1. List the nutrient, organism or causative agent associated with each nutritional disorder
2. List the symptoms associated with each disorder
3. If possible, list the species that is most affected by each disorder

L. Module 12: Equine Nutrition – At the end of this unit the student will be able to:
1. Describe the appropriate Ca:P ratio for horses
2. Discuss Selenium levels in horse feed and the clinical signs of a deficiency
3. Discuss the special nutrition for pregnant, lactating mares and foals
4. List common teeth problems that can arise in horses

M. Module 13: Small Animal Nutrition – At the end of this unit the student will be able to:

1. List and discuss the different life stages of dogs and cats and the feeding recommendations that correspond.
2. Discuss how to change a pet's food to a new variety

N. Module 14: Understanding Food Labels – At the end of this unit the student will be able to:

1. Discuss who AAFCO is and how they regulate pet foods
2. List and discuss what must appear on the packaging for pet foods
3. Discuss what is meant by meat, meat meal, byproducts and digest
4. Discuss feeding guidelines for pets
5. List and discuss the categories of pet food
6. List and discuss some common therapeutic diets for pets

O. Module 15: Small Animal: Nutritional Myths – At the end of this unit the student will be able to:

1. List and describe the common food toxins for dogs and cats and the treatment if possible.

TRANSFERABILITY:

Please consult the Alberta Transfer Guide for more information. You may check to ensure the transferability of this course at the Alberta Transfer Guide main page http://www.transferalberta.ca.

** Grade of D or D+ may not be acceptable for transfer to other post-secondary institutions. **Students are cautioned that it is their responsibility to contact the receiving institutions to ensure transferability**

EVALUATIONS:

GRADING CRITERIA:
GRADING CONVERSION CHART for ANIMAL HEALTH TECHNOLOGY
OVERALL GRADE POINT AVERAGE HAS TO BE 2.0 OR HIGHER TO BE SUCCESSFUL IN THE AHT PROGRAM.

GRADING CRITERIA:

Please note that most universities will not accept your course for transfer credit **IF** your grade is **less than C-**.

AHT GRADING						
Alpha Grade	**4-point Equivalent**	**Percentage Guidelines**		**Alpha Grade**	**4-point Equivalent**	**Percentage Guidelines**
A+	4.0	90-100		C+	2.3	67-69
A	4.0	85-89		C	2.0	63-66
A-	3.7	80-84		C-	1.7	60-62
B+	3.3	77-79		FAIL	1.3	55-59
B	3.0	73-76		FAIL	1.0	50-54
B-	2.7	70-72		WF	0.0	00-49

EXAMINATIONS	Mark Distribution
A. Quizzes & Assignments	25%
B. Midterm Exam	35%
C. Final Exam	40%
	100%

*A minimum of 60% must be obtained in order to successfully pass AH244.

COURSE SCHEDULE/TENTATIVE TIMELINE:

See course objectives for tentative timeline.

Course schedules are posted.

STUDENT RESPONSIBILITIES:

Enrolment at NWP assumes that the student will become a responsible citizen of the Institute. As such, each student will display a positive work ethic, take pride in and assist in the maintenance and preservation of Institute property, and assume responsibility for his/her education by researching academic requirements and policies; demonstrating courtesy and respect toward others; and respecting instructor expectations concerning attendance, assignments, deadlines, and appointments.

STATEMENT ON PLAGIARISM AND CHEATING:

Cheating and plagiarism will not be tolerated and there will be penalties. For a more precise definition of plagiarism and its consequences, refer to the Student Conduct section of the Northwestern Polytechnic Calendar at https://www.nwpolytech.ca/programs/calendar/ or the Student Rights and Responsibilities policy which can be found at https://www.nwpolytech.ca/about/administration/policies/index.html.

**Note: all Academic and Administrative policies are available on the same page.

Additional Information

Revision Date: September 2022