

**Sul Ross State University**  
**ANSC 4308/5327**  
**Principles of Livestock Nutrition**  
**Fall 2023**

**Instructor:** Dr. Jamie Boyd

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**Class Period:** TH 8-9:15am

**Location:** RAS 135

**Office hours:** MW 9:15-10:30

TH 10-12 or by appointment

**Course description:** Physiology and chemistry of digestion, absorption and metabolism of nutrients in animals; nutrient functions, requirements, utilization and the effects of nutrient deficiencies and toxicities. An emphasis will be placed on biochemical pathways and metabolic control of nutrient partitioning in relation to Glycolysis, TCA cycle, Urea cycle, Gluconeogenesis and additional metabolic pathways will be discussed as well as nutrient metabolism and ruminant specific metabolism. PR: CHM 1311.

**Recommended Text:** Metabolism at a Glance. Salway. 2004. 3<sup>rd</sup> edition. Blackwell Publishing.

**Purpose of the course:** This course is designed to reinforce and expand student knowledge of basic biological, biochemical, and physiological concepts relative to the principles of animal nutrition and their application in animal agriculture.

**Student learning outcomes:** Students will learn the fundamentals of digestive physiology and be able to understand how this influences nutrient utilization. Students will also learn how nutrients are metabolized to support bodily functions.

**Departmental Projected Learning Outcomes:**

- a) Recognize and be able to utilize animal breeds from a variety of domestic species.
- b) Comprehend the role of nutrition in the production of food animals.
- c) Understand the processes involved in producing meat products from a variety of domestic food animals.
- d) Select breeding animals using genetic information.

**Assessment measures:** Students will demonstrate a satisfactory level of competency, critical thinking, and knowledge of digestive physiology of mammals and birds, the functions, requirements, and utilization of nutrients, and the effects of deficiencies and toxicities of nutrients by achieving a score of 60% or higher on examinations, writing assignments, and homework.

**Recommendations for Success:** In order to succeed in this class, I recommend that you dedicate at a minimum two hours of study time per class hour each week. The material covered in this course cannot be learned adequately in only a couple days, it is cumulative and each day's material will build on the previous day. I strongly encourage you to come to class with any questions and ask them. I am also available outside of class if you have further questions in person or via email.

**Methods of instruction:** This course consists of lecture sessions to provide the basic concepts related to animal nutrition and laboratory sessions to reinforce these concepts. The course is writing intensive, which means that a large component of the final grade will come from writing activities distributed throughout the semester.

**Attendance policy:** It is your responsibility to attend class sessions. I do not provide copies of missed lecture material. There will be no make-up exams or quizzes without **prior** approval.

**Accommodations:** Students who believe that they may need accommodation in this course are encouraged to contact the Counseling and Accessibility Services Office: Ferguson Hall 112 (432-837-8203) as soon as possible to ensure that such accommodations are implemented in a timely fashion.

**Academic integrity:** Students are expected to submit original work without unauthorized assistance. Academic dishonesty, which includes cheating, unauthorized collaboration, plagiarism, fabrication, multiple submissions, and aiding and abetting, will result in a grade of 0 on the work in question. Subsequent instances of academic dishonesty may result in more serious sanctions.

**Examinations and grading:** The grade you earn is your responsibility! **There will be no extra-credit opportunities.** Your course grade will be based on the following components:

**Exams and Quizzes:** There will be four exams administered throughout the semester. The first three exams will be given in class and the dates for these are noted on the daily schedule. The fourth exam is the final exam. There will be four announced quizzes administered throughout the semester. There will be no make-up exams or quizzes without prior approval or a valid doctor's excuse. You must talk to me "live." Voice or email messages are not considered valid excuses.

**Term Paper:** Students will be required to write a 6-10 (8-12 graduate level) page scientific term paper on a unique topic of their choice relating to a metabolic or nutritional disorder. There will be several small assignments throughout the course to assist you with the preparation, organization, and completion of the term paper assignment. Additional handouts on assignment requirements, grading criteria, and helpful tips will be provided throughout the semester. Each student will submit a topic, outline with references, rough draft, 2 peer reviews, final draft, summary, and short presentation. Late rough draft and peer review assignments will not be accepted and will result in a zero on these assignments. Late rough drafts will not be peer reviewed and the student will not be able to complete the peer review assignment, resulting in a zero on the assignment.

**Journal Writing:** Each student will be required to keep a journal to summarize each class session and complete other assignments. Further instructions for journal assignments will be given throughout the semester. Journals will be turned in for review by the instructor on a biweekly basis.

**Other Considerations:** Exams may include multiple choice, fill in the blank, short answer, and matching questions. Cell phones and programmable calculators are not permitted during exams or quizzes. Due dates for all assignments will be announced in class. **Late assignments will be accepted for 5 days following the initial due date and time with a 20% penalty per day late (exception: peer review will not be accepted late).**

**Points available:**

4 1-hour exams (100 points each)	400 points
Journal writing assignments	30 points
Quizzes (10 points each)	40 points
<u>Term Paper</u>	<u>250 points</u>
<b>Total</b>	<b>720 points</b>

\* I reserve the right to give an unannounced quiz at any time during the semester.

**Grading scale:**

A = 90-100%

B = 80-89.99%

C = 70-79.99%

D = 60-69.99%

F = 59.99% or below

**Schedule of class sessions:** This information should be treated as an outline. There may be some alterations in the sequence of topics.

<u>Date</u>	<u>Lecture (Chapter)</u>	<u>Chapter</u>
Aug 29-31	Introduction and Term paper discussion Carbohydrate digestion, absorption, transport	(1, 34) (5)
Sept 5-7	Glycolysis	(6, 8, 20, 22, 48)
12-14*	Glycogen metabolism	(7, 16, 17, 18, 19)
19	Gluconeogenesis	(23)
21	<b>Exam 1</b>	
26-28	Regulation of blood glucose	(8)
Oct 3-5	TCA cycle	(24)
<b>10*</b> -12	ATP metabolism	(4)
17-19	Lipid digestion, absorption, transport	
24-26	<b>Exam 2 24<sup>th</sup></b> Fatty acid synthesis B-oxidation	(10, 11, 13, 21, 31) (14, 15, 25, 26)
31-Nov 2	Ketone bodies/Cholesterol Energy sources/Fiber	(27, 28, 32)
7-9*	Lipid energy sources Protein digestion, absorption, transport	
14-16	Protein metabolism Urea cycle <b>Exam 3-16<sup>th</sup></b>	(35, 36, 39) (33)
28-30	Amino acid metabolism Protein sources	(36, 37, 38, 42, 43, 44)
Dec 5 *	VFA metabolism Vitamins and Minerals	

**Dec 13**

**Exam 4 8-10am**

**Quizzes will be given on dates marked with an \*.**

**Instructor's bibliography:**

Harper's Illustrated Biochemistry. Murray, Granner, Mayes, and Rodwell. 2003. 26<sup>th</sup> edition. McGraw-Hill.  
 Biochemical and Physiological Aspects of Human Nutrition. Stipanuk. 2000. Saunders.  
 Basic Animal Nutrition and Feeding. Pond, Church, Pond, and Schoknecht. 2005. 5<sup>th</sup> edition. Wiley.  
 Biochemistry of Lipids, Lipoproteins and Membranes. Vance and Vance. 2004. 4<sup>th</sup> edition. Elsevier.  
 Biochemistry. Garrett and Grisham 2005. 3<sup>rd</sup> edition. Thompson, Brooks/Cole.  
 Comparative Animal Nutrition and Metabolism. Cheeke and Dierenfeld. 2010. CABI.