

**ANSC 5327 web section  
Advanced Animal Nutrition  
Spring 2024**

**Instructor:** Dr. Jamie Boyd

Office: RAS 103A

Office Hours: M, W, F 9-1 or by appointment

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**Course description:** This course is designed to continue the nutrition education with an emphasis on biochemical pathways and metabolic control of nutrient partitioning. Glycolysis, TCA cycle, Urea cycle, Gluconeogenesis, and additional metabolic pathways will be discussed as well as nutrient metabolism and ruminant specific metabolism related to VFAs.

**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 biological, biochemical, and physiological concepts relative to the principles of animal nutrition and their application in animal agriculture.

**Student learning outcomes:**

- 1) Understanding of basic intermediary metabolic pathways.
- 2) Be able to discuss the nutrient classes and their requirements, metabolism, and function.
- 3) Knowledge of specific structure and function of the ruminant digestive tract including rumen fermentation.
- 4) Ability to discuss the endogenous control of metabolic pathways and how diet variations can affect nutrient flow.
- 5) Knowledge of the role nutrients play in health and reproduction and how diet manipulation can affect overall performance.

**Departmental Projected Learning Outcomes:**

- 1) Recognize and be able to utilize animal breeds from a variety of domestic species.
- 2) Comprehend the role of nutrition in the production of food animals.
- 3) Understand the processes involved in producing meat products from a variety of domestic food animals.
- 4) 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 recognize the challenge of covering this material in an online course and I strongly encourage you to contact me via post on the class page, email or by phone with any questions or clarification requests.

**Accommodations:**

If you have a disability that may require assistance or accommodation or if you have any questions related to any accommodations for testing, note takers, readers, ect..., please speak with me as soon as possible.

**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 dates of the exams will be posted on the class page. Each exam may be taken 1 time and you will have 1 hour and 10 minutes from the time you start the exam to complete it. There will be four announced quizzes administered throughout the semester. You will have 20 minutes to complete each quiz from the time you begin.

**Term Paper:** Students will be required to write an 8-14 page scientific term paper on a unique topic of their choice relating to a metabolic or nutritional disorder. Topic must be approved by the professor and each student must have a unique topic. Topic will be approved on a first come basis. 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, final draft, and abstract.

**Journal Writing:** Each student will be required to keep a biweekly journal to summarize each week's material. This is a way to ask for clarification on the course material on an individual basis and to check your understanding of the material. Journals will be reviewed by the instructor on a biweekly basis. **Due Dates:** 1/28, 2/18, 3/10, 4/7, 4/21

**Other Considerations:** Exams may include multiple choice, fill in the blank, short answer, and matching questions. **Late assignments will be accepted for 5 days following the initial due date and time with a 20% penalty per day late.**

**Points available:**

4 1.10-hour exams (100 pts each)	400 points
Journal writing assignments (6pts each)	30 points
Quizzes (10 points each)	40 points
Term Paper	180 points
<b>Total</b>	<b>650 Points</b>

**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>
Jan 17	Introduction (1, 34) Carbohydrate digestion, absorption, transport (5)
Jan 24	Glycolysis (6, 8, 20, 22, 48)
Jan 31*	Glycogen metabolism (7, 16, 17, 18, 19) Gluconeogenesis (23)

Feb 7	<b>Exam 1</b> (opens 9 <sup>th</sup> ) Exam 2 material begins: Regulation of blood glucose (8)
Feb 14	TCA cycle (24) ATP metabolism (4)
Feb 21*	Lipid digestion, absorption, transport Fatty acid synthesis (10, 11, 13, 21, 31)
Feb 28	<b>Exam 2</b> (opens March 1st) Begin Exam 3 material: $\beta$ -oxidation (14, 15, 25, 26)
Mar 6	Ketone bodies/Cholesterol (27, 28, 32) Energy sources/Fiber Lipid energy sources
Mar 11-15	Spring Break!
Mar 20	Protein digestion, absorption, transport Protein metabolism (35, 36, 39)
Mar 27 *	Urea cycle (33) Amino acid metabolism (36, 37, 38, 42, 43, 44)
Apr 3	<b>Exam 3</b> (opens 5 <sup>th</sup> ) Begins exam 4 material: Protein sources VFA metabolism
Apr 10	Vitamins Minerals
Apr 17	Minerals
Apr 24*	Wrap-up
May 3	<b>Exam 4 opens</b>

**Dates to Remember:**

Friday, **January 26** - Proposed paper topic due by midnight  
Friday, **February 2** - **Quiz 1** opens 1 am (closes on the 4<sup>th</sup> at midnight)

Sunday, **February 4** – Discussion posting 1 opens  
Friday, **February 9<sup>th</sup>** - **Exam 1** opens 1 am (closes on the 11<sup>th</sup> at midnight)  
Friday, **February 16<sup>th</sup>** –Outline due by midnight  
Friday, **February 23rd**- **Quiz 2** opens 1am (closes on 25<sup>th</sup> at midnight)

Friday, **March 1st**- **Exam 2** opens 1am (closes on the 3rd at midnight)  
Sunday, **March 10th**- Discussion Board 1 closes (midnight)  
Sunday, **March 17th** –Discussion posting 2 opens  
Friday, **March 22nd**- Rough draft due by midnight  
Friday, **March 29<sup>th</sup>** - **Quiz 3** opens 1am (closes on 31<sup>st</sup> at midnight)

Friday, **April 5th** –**Exam 3** opens 1am (closes on 7<sup>th</sup> at midnight)

Sunday, **April 21st**- Discussion posting 2 closes (midnight)  
Friday, **April 26th-Quiz 4** opens 1am (closes on 28<sup>th</sup> at midnight)  
Sunday, **April 28th**-Final draft due by midnight  
Sunday, **April 28th**-Abstract due by midnight

Friday, **May 3rd- Exam 4** opens 1am (closes on 5th at midnight)

**About Myself:**

I grew up in South Georgia, where my family farmed cotton, peanuts, and soybeans before going to trucking fulltime. After high school, I attended Berry College in Rome GA where I received a B.S. in Animal Science. I then participated in an exchange program to Ireland where I worked on a dairy, beef, and sheep operation for the summer. I was an assistant farm manager at Shenandoah Jersey's in Maryland for 2.5yrs before returning to Georgia. I attended the University of Georgia where I received my Masters (2006) and PhD (2009) in ruminant nutrition with a focus on dairy cattle management under heat stress. After completing my PhD, I completed a post doctorate (2009-2013) program at the U.S. Dairy Forage Center-USDA-ARS in Madison, WI where I focused on NIR use on the farm and methods for measuring iNDF in forages. After leaving Wisconsin, I returned to Berry College where I have been a visiting Assistant Professor from Fall 2013-Spring 2016. During this time I was responsible for teaching a variety of courses including Introduction to Agriculture, Feeds and Feeding, Dairy Management, Forage Production, Principles of Nutrition, and Senior Seminar. I am currently an Assistant Professor at Sul Ross State University and am responsible for teaching several courses including Anatomy and Physiology, Nutrition, Feeds and Formulation, Health and Disease Management, and Freshman Seminar.

**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.