

**ANSC 5327 web section  
Advanced Animal Nutrition  
Spring 2023**

**Instructor:** Dr. Jamie Boyd

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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. Textbook provided more detailed information on the topic, but you will only be tested on the material presented in the power points. You do not need the textbook to do well in the class.

**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. **Note: Cutting and pasting responses from the notes onto exams is considered plagiarism. You must put the information in your own words to receive credit.** 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: Sunday by midnight-** 1/30, 2/20, 3/13, 4/3, 4/24

**Discussion Board:** A total of 2 discussion board topics will be posted during the semester and each discussion will be worth 50 points for a total of 100 points for this assignment group. Topics of discussion will be posted by the instructor and students will have approximately 3 weeks to complete their required posts for each board. **Students are required to make an initial entry within 7 days of the board opening or a 10-point penalty will be applied. Students are to complete a minimum of two original posts and three replies to their classmates for each discussion board topic.**

#### **Discussion Board Notes:**

While this class is being taught at a distance, students are expected to be active participants in classroom web-discussion exercises. The discussion board provides a venue to increase interaction and is used to replicate a traditional class discussion. To facilitate this discussion, the instructor will provide guiding questions for each discussion. However, as in a traditional format, students are encouraged to not only respond to questions, but also pose questions to the group and instructor. Active participation in this way increases not only your knowledge, but the knowledge of others participating in the course. You will bring unique perspectives and questions that will benefit the instructor and your classmates.

**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
Discussion Boards- (2 @ 50pts each)	100 points
Term Paper	180 points
<b>Total</b>	<b>750 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.

<b><u>Date</u></b>	<b><u>Lecture (Chapter)</u></b>
Jan 18-20	Introduction (1, 34) Carbohydrate digestion, absorption, transport (5)
Jan 23-Jan 27	Glycolysis (6, 8, 20, 22, 48)
Jan 30- Feb 3	Glycogen metabolism (7, 16, 17, 18, 19) Gluconeogenesis (23)
Feb 6-10	<b>Exam 1</b> (opens 10 <sup>th</sup> ) Regulation of blood glucose (8)
Feb 13-17	TCA cycle (24) ATP metabolism (4)
Feb 20-24	Lipid digestion, absorption, transport
Feb 27-Mar 3	Fatty acid synthesis (10, 11, 13, 21, 31)
Mar 6-10	<b>Exam 2</b> (opens 10 <sup>th</sup> ) $\beta$ -oxidation (14, 15, 25, 26)
Mar 20-24	Ketone bodies/Cholesterol (27, 28, 32) Energy sources/Fiber Lipid energy sources
Mar 27-31	Protein digestion, absorption, transport Protein metabolism (35, 36, 39)
April 3-7	Urea cycle (33) Amino acid metabolism (36, 37, 38, 42, 43, 44)
April 10-14	<b>Exam 3</b> (opens 14 <sup>th</sup> ) Protein sources
Apr 17-21	VFA metabolism
Apr 24-28	Vitamins

Minerals

May 1-5 Minerals

May 12 **Exam 4 opens**

### **Dates to Remember:**

Friday, **January 27** - Proposed paper topic due by midnight  
Friday, **Feb 3** - **Quiz 1** opens 1 am (closes on the 5th at midnight)

Sunday, **February 5**– Discussion posting 1 opens  
Friday, **February 10<sup>th</sup>** - **Exam 1** opens 1 am (closes on the 12<sup>th</sup> at midnight)  
Friday, **February 17<sup>th</sup>** –Outline due by midnight

Friday, **March 3- Quiz 2** opens 1am (closes on 5th at midnight)  
Friday, **March 10<sup>th</sup>- Exam 2** opens 1am (closes on the 12<sup>th</sup> at midnight)  
Sunday, **March 5<sup>th</sup>-** Discussion Board 1 closes (midnight)  
Sunday, **March 5<sup>th</sup>** –Discussion posting 2 opens  
Sunday, **March 26<sup>th</sup>-** Rough draft due by midnight  
Friday, **March 31<sup>st</sup> - Quiz 3** opens 1am (closes on 2nd at midnight)

Friday, **April 14<sup>th</sup> –Exam 3** opens 1am (closes on 16<sup>th</sup> at midnight)  
Sunday, **April 16<sup>h</sup>-** Discussion posting 2 closes (midnight)  
Sunday, **April 30<sup>th</sup>-**Final draft due by midnight  
Friday, **April 28<sup>th</sup>-Quiz 4** opens 1am (closes on 30<sup>th</sup> at midnight)  
Monday, **April 30<sup>th</sup>-**Abstract due by midnight

Friday, **May 12<sup>th</sup>- Exam 4** opens 1am (closes on 16<sup>th</sup> 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.