

**ANSC 5327**  
**Advanced Animal Nutrition**  
**Spring 2016**

**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.

**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.

**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 15 minutes from the time you start the exam to complete it. There will be four announced quizzes administered throughout the semester.

**Term Paper:** Students will be required to write a 6-12 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 weekly 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.

**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 2-3 weeks to complete their required posts for each board. Students are to complete a minimum of two original posts and 3 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 4 days following the initial due date and time with a 20% penalty per day late.**

**Points available:**

|   |                   |
|---|-------------------|
| 4 1.25-hour exams (100 pts each)        | 400 points        |
| Journal writing assignments (5pts each) | 25 points         |
| Quizzes (10 points each)                | 40 points         |
| Discussion Boards- (2 @ 50pts each)     | 100 points        |
| Term Paper                              | 190 points        |
| <b>Total</b>                            | <b>755 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 19-22     | Introduction (1, 34)<br>Carbohydrate digestion, absorption, transport (5)              |
| Jan 25-29     | Glycolysis (6, 8, 20, 22, 48)  |
| Feb 1-5       | Glycogen metabolism (7, 16, 17, 18, 19)<br>Gluconeogenesis (23)                        |
| Feb 8-12      | <b>Exam 1</b> (opens 11 <sup>th</sup> )<br>Regulation of blood glucose (8)             |
| Feb 15-19     | TCA cycle (24)<br>ATP metabolism (4)   |
| Feb 22-26     | <b>Exam 2</b> (opens 26 <sup>th</sup> )<br>Lipid digestion, absorption, transport      |
| Feb 29- Mar 4 | Fatty acid synthesis (10, 11, 13, 21, 31)<br>$\beta$ -oxidation (14, 15, 25, 26)       |
| Mar 7-10      | Spring Break!  |
| Mar 14-18     | Ketone bodies/Cholesterol (27, 28, 32)<br>Energy sources/Fiber<br>Lipid energy sources |
| Mar 21-25     | Protein digestion, absorption, transport<br>Protein metabolism (35, 36, 39)            |
| Mar 28-Apr 1  | Urea cycle (33)<br>Amino acid metabolism (36, 37, 38, 42, 43, 44)                      |
| Apr 4-8       | <b>Exam 3</b> (opens 4 <sup>th</sup> )<br>Protein sources<br>VFA metabolism            |
| Apr 11-15     | Vitamins<br>Minerals   |

|              |                     |
|--------------|---------------------|
| Apr 18-22    | Minerals            |
| Apr 25-May 5 | Wrap-up and Review  |
| April 9      | <b>Exam 4 opens</b> |

**Dates to Remember:**

Friday, January 29 - Proposed paper topic due by midnight  
 Friday, January 29 – Discussion posting 1 opens  
 Friday, February 5 - Quiz 1 opens 6 am (closes on the 7<sup>th</sup> at midnight)  
 Thursday, February 11<sup>th</sup> - Exam 1 opens 6 am (closes on the 14<sup>th</sup> at midnight)  
 Friday, February 19<sup>th</sup> –Outline due by midnight  
 Friday, February 26<sup>th</sup>- Discussion Board 1 closes (midnight)  
 Friday, February 26<sup>th</sup>- Quiz 2 opens 6am (closes on 28<sup>th</sup> at midnight)  
 Monday, March 7<sup>th</sup> –Discussion posting 2 opens  
 Friday, March 4<sup>th</sup>- Exam 2 opens 6am (closes on the 7<sup>th</sup> at midnight)  
 Monday, March 14<sup>th</sup>- Rough draft due by midnight  
 Wednesday, March 30<sup>th</sup>- Quiz 3 opens 6am (closes on 4/1 at midnight)  
 Monday, April 4<sup>th</sup> –Exam 3 opens 6am (closes on 6<sup>th</sup> at midnight)  
 Tuesday, April 12<sup>th</sup>- Discussion posting 2 closes (midnight)  
 Friday, April 15<sup>th</sup>-Final draft due by midnight  
 Monday, April 18<sup>th</sup>-Abstract due by midnight  
 Tuesday, April 26<sup>th</sup>-Quiz 4 opens 6am (closes on 28<sup>th</sup> at midnight)  
 Monday, May 9<sup>th</sup>- Exam 4 opens 6am (closes on 12<sup>th</sup> at midnight)

**About Me:**

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 have been responsible for teaching a variety of courses including Introduction to Agriculture, Feeds and Feeding, Dairy Management, Forage Production, Principles of Nutrition, and Senior 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.