ANS5446 - Animal Nutrition

Fall 2024

Welcome to Animal Nutrition! I am excited to be working with you this semester and I are looking forward to a fun and productive semester!

"Without continual growth and progress, such words as improvement, achievement, and success have no meaning."– Benjamin Franklin

Instructor

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Office hours: I will be available in the classroom for 10 minutes both before and after each lecture to answer any course-related questions. You're also welcome to schedule an appointment by emailing me through Canvas Inbox.

Email Policy: Please use Canvas Inbox for all course-related communications. I usually respond to Canvas Inbox messages daily, while I typically respond to regular emails within 2-3 working days (Monday–Friday, 8:30 am – 5:00 pm).

Note: If you have a question that might interest other students as well, please post it on the Canvas Discussion board instead of emailing me. Everyone is welcome to answer and participate in the discussion.

Course Information

Description: We will discuss carbohydrates, fats, and proteins and their functions in the animal body.

Credits: This is a 3 credits course. This course is designed with the expectation that for every hour spent in class, students will spend at least 2 hours studying outside the classroom.

Prerequisites: ANS 3440, BCH 3025 or BCH 4024, or permission of instructor.

Meeting Days, Time, and Location: Mondays and Wednesdays from 1:55 pm to 3:50 pm. We will be meeting in the Dairy Science Building, room 102. Students taking the course online can access the Zoom link in the Canvas page (Canvas >> Zoom conferences).

Course Objectives: Students will learn:

- The major nutrients and energy sources in feeds fed to livestock, their requirements, and their measurement.
- Digestive physiology and gastrointestinal microorganisms and their role in nutrient utilization.
- Carbohydrates, lipids, and proteins and their classification, chemical structure, function, and their distribution in various classes of feeds.
- Major pathways in intermediary metabolism of carbohydrates, lipids, and proteins.
- The regulation of nutrient metabolism and feed consumption.

Course Resources: No textbook is required, but we will be using some chapters of the books listed below.

- Church. The Ruminant Animal: Digestive Physiology and Nutrition. 1988.
- Dehority. Rumen Microbiology. 2003.
- Nelson, D. L., & Cox, M. M. Lehninger Principles of Biochemistry. 2017
- Pond, Church, and Pond. Basic Animal Nutrition and Feeding. 1995.
- Van Soest. Nutritional Ecology of the Ruminant. 1994.
- Wu. Principles of Animal Nutrition. 2018.
- Also, key research papers will be provided.

Evaluation Methods and Criteria

The following evaluation methods and criteria will be used in this class:

Item	Points	Percentage of Final Grade
Three exams (200 points each) *	600	60
Lecture/reading material summaries (100 points each)	300	30
Presentation	100	10
Total	**1000**	**100**

*Exams are not cumulative.

Exams: Each exam will include 10 essay questions, each worth 20 points. Students will have 110 minutes to complete the exams. The questions will cover lecture materials, reading assignments, and in-class discussions. There will be no make-up exams, so you are expected to take each exam on its scheduled date. After grading, we will review the exams together in class. To encourage reflection and reduce stress, one or two of the lowest-scoring questions from exams 1 and 2 will be offered as extra credit (up to a total of 10 points) on the following exam.

Lecture/reading material summaries: The objective of the lecture/reading material summaries is to assist you in retaining key information, enhancing comprehension, and effectively organizing your knowledge. You are expected to address all learning objectives from the lectures and the central points of each reading material within your summaries. Students are strongly encouraged to work in the summaries promptly after each lecture. There is no specified summary format; feel free to structure it in a way that aligns with your learning style. I will supply a questionnaire to help you identify your learning style, and I will also present examples of summaries customized for both verbal and visual learners in class.

Presentation: Ever wondered how something was discovered or how a particular method was established? Now is your chance to satisfy that curiosity! Each student will prepare and deliver a short presentation on the historical perspective of a topic related to animal nutrition. The presentation should last 10 minutes, followed by a 3-minute question and answer session. A presentation example will be provided in class. Here are a few examples of topics you can use for your presentation, but you are strongly encouraged to propose your own topic.

- Discovery of rumen microorganisms and their role in digestion.
- Discovery of lipolysis and biohydrogenation of unsaturated fatty acids in the rumen.
- Discovery of how non-protein nitrogen is used by rumen microbes.
- Discovery of microbial protein synthesis in the rumen.
- Development of rumen-protected nutrients.
- Utilization of monensin in ruminant diets.
- Development of *in ovo* feeding.
- Discovery and development of probiotics.
- Utilization of co-products in ruminant diets.
- Classification of amino acids into essential and non-essential categories.
- Discovery of protein digestion in the stomach and small intestine.
- Discovery of the role of pancreatic and bile secretions in digestion.
- Discovery of the role of micelles in fatty acid digestion.
- Discovery of fatty acid transport in the body.

- Discovery of how SCFA are absorbed and metabolized in the rumen and large intestine epithelium.
- Discovery of the role of SCFA in animal metabolism.
- Classification of carbohydrates into fibrous and non-fibrous categories.
- Discovery of the role of omega-3 fatty acids in reproduction.
- Development of feed enzymes to enhance nutrient utilization.
- Development of bioenergetics.
- Development of techniques to measure nutrient digestibility.
- Development of techniques to measure feed passage rate.
- Development of techniques for forage conservation (silage and haylage).
- Development of ration formulation software.

The presentation will be evaluated using the following criteria:

- Depth of content (50 points): Ensure the presentation includes rigorous and objective scientific content. It should feature at least three key scientific articles that highlight important milestones and discoveries related to the chosen topic. Also, emphasize the key scientist/s associated with the discoveries.
- Quality of visual aids (15 points): Effective PowerPoint slides are expected, featuring organization, clarity, and professionalism. Ensure that the axes of the graphics are clearly labeled.
- Quality of oral presentation (15 points): Presentation must be rehearsed, engaging, and articulate, with proper grammar usage and avoidance of slang terms.
- Ability to answer questions (15 points): Responding to questions is crucial and reflects overall knowledge. Responses should go beyond simple yes or no answers, demonstrating critical thinking and an ability to address differing viewpoints.
- Presentation time (5 points): The presentation should last 10 ± 1 minute.

Guidelines to prepare and deliver a polished and effective presentation:

- Start Early (I cannot emphasize this enough!!): Start preparing your presentation well in advance to allow plenty of time for research, design, and practice. Do not be misled by the presentation's length—you will need to invest a significant amount of time researching the topic to create a reasonable presentation.
- Structure Your Presentation:
    - Introduction: Start with a brief overview of the topic and its significance.
    - Objectives/Hypothesis: Clearly state the goals of your research or presentation.
    - Methods: Explain the methodology concisely, focusing on key aspects.
    - Results/Discussion: Present your findings clearly with visual aids like charts and graphs. Interpret the results and explain their implications.
    - Conclusion: Summarize the key points and suggest future directions or applications.
- Design Effective Slides:
    - Simplicity: Keep slides simple with minimal text. Use bullet points and avoid overcrowding.
    - Visuals: Use high-quality images, graphs, and diagrams to illustrate your points.
    - Consistency: Maintain a consistent style and layout throughout the presentation.
    - Legibility: Ensure text is large enough to be read from a distance.
    - Proofread: Check for spelling and grammatical errors.

    - Clear Transitions: Use clear transitions between sections to help the audience follow your narrative.
- Practice Your Delivery (Again, I cannot emphasize this enough!!):
    - Rehearse: Practice your presentation multiple times to become familiar with the content and timing.
    - Time Yourself: Ensure your presentation fits within the allotted time.
    - Speak Clearly: Use a clear, audible voice and moderate your pace.
    - Engage with the Audience: Make eye contact and use gestures to emphasize points.
    - Practice with your lab group, friends, and/or family. You will become more comfortable as you practice.
- Prepare for Questions:
    - Anticipate Questions: Think about potential questions your audience might ask and prepare your answers.
    - Stay Calm: If you don't know the answer, it is okay to admit it and offer to follow up later.
- Use Tools and Technology Wisely:
    - Check Equipment: Test any equipment and software you will be using beforehand to avoid technical issues.
    - Backup Plan: Have a backup copy of your presentation in multiple formats (e.g., USB drive, email).

Grade Scheme: The following grading standards will be used in this class:

Grade	Range	Points
A	90.0 – 100%	900 - 1000
B+	85.0 - 89.9%	850 - 899
B	80.0 - 84.9%	800 - 849
C+	75.0 - 79.9%	750 - 799
C	70 - 74.9%	700 - 749
D+	65 - 69.9%	650 - 699
D	60 - 64.9%	600 - 649
E	< 59.9%	< 599

Course Schedule and Deadlines

The table below contains a tentative course schedule and deadlines. I reserve the right to alter this schedule as needed during the semester.

Date	Weekday	Lecture Topic	Required Readings	Deadlines
26-Aug	Mon	Syllabus and Introduction		
28-Aug	Wed	Digestive Physiology and GIT microbiology	O'Hara et al. 2020	
2-Sep	Mon	No class - Holiday		
3-Sep	Tue	-	-	Presentation topic (12 pm)
4-Sep	Wed	Digestive Physiology and GIT microbiology	Krause et al., 2013	
9-Sep	Mon	Measurement of feed and nutrient utilization	Stern et al. 1997	
11-Sep	Wed	Feed analysis and composition	Ferreira and Thiex, 2022	
16-Sep	Mon	Feed analysis and composition	Hall, 2003	
17-Sep	Tue	-	-	Lecture/reading material summary (12 pm)
18-Sep	Wed	**Exam 1**		
23-Sep	Mon	Lipids	Doreau and Chilliard, 1997	
25-Sep	Wed	Lipids	Palmquist and Jenkins 2017	Draft presentation slides (12 pm)
30-Sep	Mon	Carbohydrates	Adesogan et al., 2019	
2-Oct	Wed	Carbohydrates	Huntington, 1997	
4-Oct	Fri	-	-	Lecture/reading material summary (12 pm)
7-Oct	Mon	**Exam 2**		
9-Oct	Wed	Protein and Nitrogen	Bach et al., 2005	
14-Oct	Mon	Protein and Nitrogen	Harmon and Swanson, 2020	
16-Oct	Wed	Regulation of feed intake	Allen, 2000	
21-Oct	Mon	Regulation of feed intake	Florant and Healy, 2012	
22-Oct	Tue	-	-	Lecture/reading material summary (12 pm)
23-Oct	Wed	**Exam 3**		
25-Oct	Fri	-	-	Final presentation slides (12 pm)
28-Oct	Mon	Presentations*		
30-Oct	Wed	Presentations*		
4-Nov	Mon	Presentations*		

*The order of presentations will be determined by random draw.

Tips to Succeed in This Course

- Attend the lectures.
- Arrive on time. The first 5-7 minutes of each lecture will review key points from the previous class. Use this time to clarify concepts and ask questions.
- Take notes (preferably on paper). Not all information will be on the slides, so paying attention and taking notes is essential.
- Read the assigned materials.
- Ask questions! You can ask them during class, via email, or by visiting our offices.
- Revise regularly. Review lecture materials/reading materials after each class.
- Find a study partner. Studying with someone can keep you motivated and provide additional insights into the course material.
- Start to prepare your presentation in advance.
- Stay active, eat well, and get enough sleep.

Course Policies

Attendance Policy and Make-Up Policy: Class attendance is not mandatory but strongly encouraged. Requirements for class attendance, assignments and other work are consistent with university policies that can be found at: https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/.

Online course evaluation process: Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at gatorevals.aa.ufl.edu/students/. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via ufl.bluera.com/ufl/. Summaries of course evaluation results are available to students at gatorevals.aa.ufl.edu/public-results/ .

Students Requiring Accommodations: Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the disability Resource Center by visiting https://disability.ufl.edu/students/get-started/. It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

University Honesty Policy: UF students are bound by The Honor Pledge which states, "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment." The Honor Code (https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

Software Use: All faculty, staff, and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

Student Privacy: There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information, please see:
http://registrar.ufl.edu/catalog0910/policies/regulationferpa.html

UF Resources

Health and Wellness:

- **U Matter, We Care**: If you or a friend is in distress, please contact umatter@ufl.edu or 352-392-1575 so that a team member can reach out to the student.
- **Counseling and Wellness Center:** http://www.counseling.ufl.edu/cwc, and 352-392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.
- **Sexual Assault Recovery Services (SARS):** Student Health Care Center, 352-392-1161.
- **University Police Department:** 352-392-1111 or 911 for emergencies or http://www.police.ufl.edu/

Academic Resources:

- **E-Learning Technical Support:** 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu. https://lss.at.ufl.edu/help.shtml
- **Career Resource Center:** Reitz Union, 352-392-1601. Career assistance and counseling. https://www.crc.ufl.edu/
- **Library Support:** http://cms.uflib.ufl.edu/ask. Various ways to receive assistance with respect to using the libraries or finding resources.
- **Teaching Center:** Broward Hall, 392-2010 or 392-6420. General study skills and tutoring. https://teachingcenter.ufl.edu/.
- **Writing Studio:** 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers. https://writing.ufl.edu/writing-studio/
- **Student Complaints Campus:** https://www.dso.ufl.edu/documents/UF_Complaints_policy.pdf