

**Sustainable Livestock Production Systems**  
**Course Syllabus**  
**Fall 2021**

**Course listing:** AVS 4500/4501 and AVS 8220

**Date/Time:** Tuesday and Thursday, 12:30 am to 13:45 am and Tuesday 14:00 pm to 15:50 pm (Lab)

**Location:** Lecture in Poole Agricultural Center B112  
Lab in Poole Agricultural Center B112

**Instructor:** Matias Aguerre, Ph.D., 120 Poole Agricultural Center ([maguerr@clermson.edu](mailto:maguerr@clermson.edu))  
Office hours: By appointment only

**Course Learning Objectives:**

Students who actively participate in this class will develop the skills to **critically evaluate** livestock production systems as they relate to sustainability and climate change using recent findings from biological, physical, and social sciences.

Students will learn to **interpret** and **analyze** knowledge from crop science, livestock science, environmental science, and social science about distinct livestock production systems, including:

- The complexity and relative sustainability of livestock systems.
- Contribution to climate change: greenhouse gas emissions (CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O).
- Environmental impact of excess nutrient excretion (P and N mainly).
- Mitigation of climate change and excess nutrient excretion: carbon sequestration and emissions reduction.
- Adaptation to climate change: adapting management of production systems to changing weather patterns.
- Students will develop **team working** skills.
- Students will improve their research and writing skills in drafting academically rigorous literature reviews.
- Students will learn to **assess** the broader impacts of research beyond the academic setting.
- Students will develop their ability to **communicate** and **explain** information to multiple audiences through multiple media, including:
  - Preparation and presentation of a topic.
  - Journal club style presentation/discussion.
  - Written and audio-visual presentation of your findings in a case study article.
- This course also integrates targeted student learning outcomes related to critical thinking to increase and enhance students **critical thinking** skills. **Critical Thinking** is the process of reflective judgment, which manifests itself in reasoned consideration of evidence, context, methods, standards, and conceptualizations for the purpose of deciding what to believe or what to do (The Delphi Report: Executive Summary: (1990), ERIC Doc ED315 423). This course is being offered as a Clemson Thinks2 (CT2) seminar course. The CT2 initiative at Clemson is part of the university's strategic plan; its objective is to create engaged learning environments that promote critical thinking skills among students.

- Recognizing that scientific knowledge could change over time, particularly with the use of new technologies, students should acknowledge the critical thinking process in scientific work and how it could lead to the right or wrong conclusions if not carefully assessed. Thus, they learn to always consciously go back to their work and **self-consciously monitor their cognitive activities.**

### **Teaching Methods:**

The teaching methods used in this class will be a combination of lectures from the instructor and/or guest speakers and ACTIVE participation of students before, during and after class. Learning activities will include: Before class reading assignments followed by small group in- class discussion of an assigned article, quizzes, worksheets, and a group (2-3 students) writing and oral assignment (term paper with oral presentation).

### **Roles of Students and Instructor:**

**Your role as a student:** As a student, you are expected to take an **active** role in developing a basic understanding of forage production for livestock. Think of the reading assignments, the class discussions, quizzes, and the class project (term paper) as ways to gain new knowledge and to gain skills in critical evaluation of the sustainability of livestock systems. The ways you can be “proactive” in this class include:

- **Be prepared for class and teamwork:** To maximize the benefits from our discussions, it is important that you complete the reading assignments and other homework BEFORE class (**when applicable**). Allocate enough time to read the assigned material carefully. Think of the reading as a way of helping yourself find out what you know and what you don't know or don't fully understand. For making sense of the course material, you have to continually question yourself, your teammates, your classmates, and your instructor.
- **Be an active participant in class:** Active participation in class means listening, thinking, taking notes, and asking questions. There are (almost) no “stupid questions” in this class. As long as you have a genuine interest in learning the subject matter, all questions will be valid questions! Be honest with yourself and you'll find out what your current level of knowledge really is, and what your misunderstandings might be.

Although it may vary, here is what you are typically expected to do for this class:

#### **Before class:**

- Read the assigned material (papers or articles) posted on Canvas complete the reading assignments and other homework BEFORE class (when applicable).

**During class:** Bring a printout of the article (or other assigned material) or your laptop to access the reading material in class and when applicable the reading assignment/homework. We may engage in any of the following class activities:

- Introduction of the topic with a lecture from instructor or invited speakers.
- Short quiz at the beginning of class with simple questions about the previous lectures and assign readings (including the assignments ready for the day of the quiz),
- Group discussion of assignments/homework.
- Work in groups (teams of 3-4 students) to summarize and discuss the assigned article.
- Discuss a case study (mainly during the laboratory class).
- Field trips to different livestock operations to see how they operate differently **(tentative)**.

**After class**, you are expected to:

- Review the material in a way that make sense to you.
- If necessary, make an appointment with the class instructor for help.

**My role as an instructor:** As your instructor, my goal is to help you learn (and as a result help you get good grades). The variety of instruction strategies used for the course will help you acquire knowledge THAT MAKES SENSE TO YOU. I am happy to accommodate for the variety of interests that each student brings to class, but to do so, I need to hear from you! Don't be afraid to set a time to visit with me if you have any concerns. In other words, I want this course to be of interest to each one of you. I hope this class will motivate you to expand your interest in forage management. My role is:

- To define the course topics and relative importance of various subject matters,
- To provide you with the information and resources you need to learn,
- To communicate with you in a way that facilitates your learning,
- To set the level of expectation and evaluate your progress and your work.

### **Required material:**

No textbook is required for this course. Materials including supplemental reading, reference textbooks, handouts and spreadsheets will be posted on Canvas. Every effort will be made to place the course material on the course management system in a timely manner.

**Grading:** Below is the list of items that will be part of your final grade:

1. **Class Participation:** Pre-class quizzes (on-line) and/or reading assignments **(50 pts)**.
2. **Mid-term exam:** October 14th: A 1-hr in-class exam that will include multiple choice questions drawn from lecture presentations, discussion sheets, class discussions and other class-related activities. **(100 pts)**.

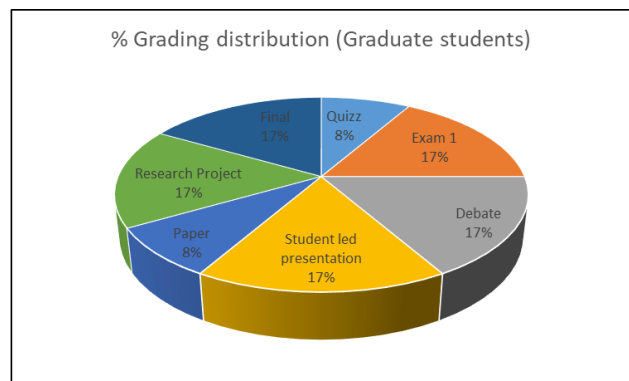
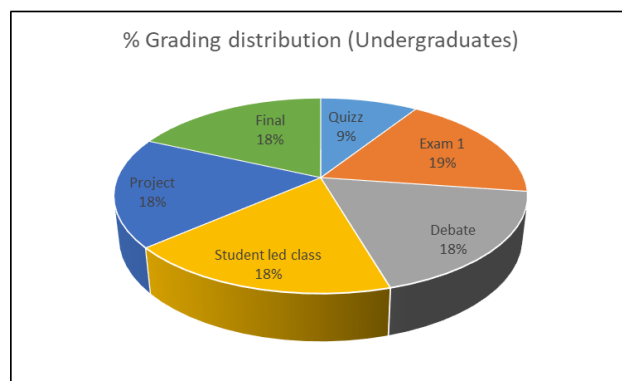
3. **In class debate:** The debate format will provide students the opportunity to work in a collaborative and cooperative group setting. By discussing and organizing your points of view for one side of an argument, you will be able to discover new information and put knowledge into action. In addition, you will learn through friendly competition, examine controversial topics and “strengthen skills in the areas of leadership, interpersonal influence, teambuilding, group problem solving, and oral presentation” Further instructions, resource materials and topics can be found in the Team debate description document (I will upload it to Canvas before September 3rd). **(100 pts)**.
4. Prepare and make an in-class student led team presentation and discussion of a mitigation strategy to reduce the environmental impact of livestock operations **(100 pts)**.
5. **Paper presentation (Graduate students only):** Prepare and make an in-class student-led discussion of one peer review article that was identified as very relevant to the research project (see below bullet point 7). The presentation will be during the laboratory session. The goals of the discussion are to help everyone gain an overall understanding of the paper including the methodology to carry out the research and to learn the main findings of the scientific report. More specifically the discussion should also provide the graduate student with useful, constructive comments and suggestions from classmates to engage more deeply in the research project. **(50 pts)**.
6. **Final Project (undergraduates only):** The group project is the heart of the course. Through your efforts, with guidance and feedback from the instructor, you will learn how to make evidence-based assessments and recommendations on livestock systems sustainability (greenhouse gas emissions, adaptation, mitigation, and social implications). Groups will form early in the semester to begin the important process of team building and topic identification. Is a two-part project. In Part I, teams will select contrasting livestock production system (e.g., dairy organic vs. conventional or cage free vs. cage egg production) and develop a written case-study style report reviewing recent peer review published research discussing the sustainability of the different selected systems. In Part II, each team will give a ~20-minute in-class presentation summarizing their findings reported in Part I. Further instructions and resource materials can be found in the Team project description document (I will upload it to Canvas before September 3rd). **Teams should seek instructor approval of your topic choice before proceeding.** Both the written material and the oral presentation will be grade on a scale of 0 to 100 pts. In calculating the final grade for the project, a 0.7 and 0.3 weighing will be given to the written material and the oral presentation, respectively. **(100 pts)**.
7. **Graduate students Research Project (Graduate students only):** Is a two-part project. In Part I, graduate students will select a livestock production system and develop a written report reviewing recent (not older than 10 years) peer-reviewed published research evaluating the sustainability (environmental, social, or economic) of the system. In Part II, students will elaborate a proposal for a research project to expand in some of the findings/conclusions from the review section of their report. Further instructions and resource materials can be found in the research project description document (I will upload it to Canvas before September 3rd). **Seek instructor approval of your topic choice before proceeding.** Each graduate student will give a ~25-minute in-class presentation with a brief description of his or her review of literature and proposed experiment. Both the written material and the oral presentation will be grade on a scale of 0 to 100 pts. In calculating the final grade for the project, equal weighing (0.5 and 0.5) will be given to the written material and the oral presentation, respectively. **(100 pts)**.

8. **Final exam Monday December 6, 3:00 pm (100 pts):** Final cumulative exam (70% of the exam will be from material not covered in the previous exam).

**How will Letter grade be assigned?** A criterion-referenced grading will be used in this class and therefore you do not need to worry about your standing relative to others in this course. In fact, working together with others may be to everyone's advantage. Letter grades will be assigned according to the following scale:

Undergraduate students: A = 90%+ | B = 80 to 89% | C= 70 to 79% | D = 60 to 69 | F = 0 to 60.

Graduate students: A = 90%+ | B = 80 to 89% | C= 70 to 79% | F = 0 to 69%.



### **Professional Etiquette Guidelines:**

1. All assignments are due by the listed deadline.
2. Assignments should be typed up in a neat professional manner a) Word documents and written communication should be neatly typed and formatted (i.e., 12 pt. font and a common font style. e.g., Arial, TNR; 1" margins) b) Include your name, course, date, and assignment title with all assignments submitted c) Use quality (not quantity) writing and proper grammar to clearly communicate your understanding / obtainment of assignment objectives!! Poorly written assignments will receive a 10% deduction.
3. Include your name and course number in all e-mail correspondence.
4. Practice good professional behavior in all communications.
5. As a common courtesy to everyone in class, cellular telephones and any other communication or messaging devices are to be turned off during class time or left at home. This includes online chatting and other non-class related laptop activities. Abuse of this last policy will result in an unexcused absence and a zero being assigned for one homework grade. (Note: Text messaging, online chatting, and doing homework on laptops during class are considered an abuse of this policy).

### **Specific COVID-19 related information for in-person classes:**

While on campus, face coverings are required in all buildings and classrooms. Face coverings are also required in outdoor spaces where physical distance cannot be guaranteed. Please be familiar with the additional information on the Healthy Clemson website, such as the use of wipes for in-person classes. If an instructor does not have a face covering or refuses to wear an approved face covering without valid accommodation, students should notify the

department chair. If a student does not have a face covering or refuses to wear an approved face covering without valid accommodation, the instructor will ask the student to leave the academic space and may report the student's actions to the Office of Community & Ethical Standards as a violation of the Student Code of Conduct. If the student's actions disrupt the class to the extent that an immediate response is needed, the instructor may call the Clemson University Police Department at 656-2222.

### **Attendance Policy:**

Clemson University undergraduate student attendance policies are available in the undergraduate catalog. This includes sections on attendance policy, enrollment, anticipated absences, unanticipated absences, excused absences, appeals, and auditing. Lecture attendance is not mandatory. Please note the STUDENT is responsible for keeping current with assignments and any additional reading that may be assigned. The professor will be available during schedule office visits to clarify information discussed in lecture but will **not** repeat or "make up" lecture time for those who missed class. Students requesting make-up exams for an excused absence **must** provide acceptable documentation (e.g., doctor's note or hospital admission copy form; etc.). Excused absences will be given only for illness requiring hospital admission or care by physician, university-sponsored trips and events, or for loss of an immediate family member. Several days advance notice for all non-emergency absences is required (e.g., university sponsored trips).

### **Topic outline for Tuesday and Thursday lectures (tentative):**

1. Thursday 8-19 Course particulars, introduction.
2. Tuesday 8-24 The challenge of feeding 9 billion people.
3. Thursday 8-26 Sustainable Agriculture: Definitions and Terms.
4. Tuesday 8-31 Greenhouse gas emissions and excess nutrient excretion (N and P).
5. Thursday 9-2 Environmental sustainability and human health.
6. Tuesday 9-7 What if we got rid of livestock?
7. Thursday 9-9 Alternative proteins sources.
8. Tuesday 9-14 Overview dairy systems.
9. Thursday 9-16 Tentative Invited Speaker Dr. Buresh. Topic: Overview poultry systems.
10. Tuesday 9-21 Overview beef systems. Part 1.
11. Thursday 9-23 Overview beef systems. Part 2.
12. Tuesday 9-28 Overview swine systems.
13. Thursday 9-30 Gaseous emission from manure.
14. Tuesday 10-5 Carbon sequestration and gaseous emission from soils.
15. Thursday 10-7 No class.
16. Tuesday 10-12 Fall break. Carbon sequestration
17. Thursday 10-14 Mid-term exam
18. Tuesday 10-19 Environmental burden of egg, milk, and meat (poultry, pork, and beef) produced in the United States.
19. Thursday 10-21 Student led class: Best practices and emerging options to reduce environmental impact of livestock operations.
20. Tuesday 10-26 Student led class: Best practices and emerging options to reduce environmental impact of livestock operations.
21. Thursday 10-28 Student led class: Best practices and emerging options to reduce environmental impact of livestock operations.
22. Tuesday 11-2 Student led class: Best practices and emerging options to reduce environmental impact of livestock operations.

23. Thursday 11-4: Invited Speaker: Dr. Lascano. Topic: Food security.
24. Tuesday 11-9: Team project presentation.
25. Thursday 11-11: Team project presentation.
26. Tuesday 11-16: Team project presentation.
27. Thursday 11-18: Team project presentation.
28. Tuesday 11-23 and Thursday 11-25: Thanksgiving week (**no class**).
29. Tuesday 12-1 Team project presentation.
30. Thursday 12-3 Class overview before final exam.
31. Monday 12-6 Final Exam.

**Topic outline for Tuesday lab (tentative):**

1. Tuesday 8-24 Description of team debate, student led discussion and team project.
2. Tuesday 8-31 Invited speaker: Marguerite Helen Albro (tentative). Topic: How to conduct a literature research.
3. Tuesday 9-7 Methods to evaluate sustainability. Introduction to case studies
4. Tuesday 9-14 What is an LCA? Case study 1.
5. Tuesday 9-21 Case study 2.
6. Tuesday 9-28 Team debate.
7. Tuesday 10-5 Team debate.
8. Tuesday 10-12 Fall break.
9. Tuesday 10-19 Team debate.
10. Tuesday 10-26 Team debate.
11. Tuesday 11-2: Graduate student led discussion.
12. Tuesday 11-9: Graduate student led discussion.
13. Tuesday 11-19: Field trips (Tentative).
14. Tuesday 11-24: Thanksgiving week (**no class**).
15. Tuesday 12-1: Field trips (Tentative).

## **Academic Continuity**

Clemson has developed an Academic Continuity Plan for academic operations. Should university administration officially determine that the physical classroom facility is not available to conduct classes, class will be conducted in a virtual (online) form. The university issues official disruption notifications through email, website, text notification and social media. When notified, use one of the following links to navigate to Clemson Canvas where you will find important information about how we will conduct class:

- Primary access link: <http://www.clemson.edu/canvas>
- Secondary access link, if needed: <https://clemson.instructure.com/>
- You can also use the Canvas Student App. Visit the downloads page for this app.

Course activities will occur through the Canvas course.

## **Copyright material:**

Materials from published sources (books, articles, and even videos) are protected under copyright. When used for educational purposes, they are intended for use only by students enrolled in a particular course and only for instructional activities associated with the course. They may not be retained in another medium or disseminated further as described in the provisions of the Teach Act. Students should refer to the Clemson Libguide Use of Copyrighted Materials and the “Fair Use Guidelines” policy on the Clemson University website for additional information.

## **Message from Student Accessibility Services:**

Clemson University values the diversity of our student body as a strength and a critical component of our dynamic community. Students with disabilities or temporary injuries/conditions may require accommodations due to barriers in the structure of facilities, course design, technology used for curricular purposes, or other campus resources. Students who experience a barrier to full access to this class should let the instructor know and make an appointment to meet with a staff member in Student Accessibility Services as soon as possible. You can make an appointment by calling 864-656-6848, by emailing [studentaccess@lists.clemson.edu](mailto:studentaccess@lists.clemson.edu), or by visiting Suite 239 in the Academic Success Center building. Appointments are strongly encouraged – drop-ins will be seen, if at all possible, but there could be a significant wait due to scheduled appointments. Students who have accommodations are strongly encouraged to request, obtain, and send these to their instructors through their AIM portal as early in the semester as possible so that accommodations can be made in a timely manner. It is the student’s responsibility to follow this process each semester.

You can access further information at the [Student Accessibility website](#). Other information is at the university’s [Accessibility Portal](#).

## **THE CLEMSON UNIVERSITY TITLE IX STATEMENT REGARDING NON-DISCRIMINATION):**

The Clemson University Title IX statement: Clemson University is committed to a policy of equal opportunity for all persons and does not discriminate on the basis of race, color, religion, sex, sexual orientation, gender, pregnancy, national origin, age, disability, veteran’s status, genetic information or protected activity in employment, educational programs and activities, admissions and financial aid. This includes a prohibition against sexual harassment and sexual violence as mandated by Title IX of the Education Amendments of 1972. This Title IX policy is



located on the Campus Life website. Ms. Alesia Smith is the Clemson University Title IX Coordinator, and the Executive Director of Equity Compliance. Her office is located at 223 Brackett Hall, 864.656.0620. Remember, email is not a fully secured method of communication and should not be used to discuss Title IX issues.

### **Academic Integrity (from University Announcements):**

As members of the Clemson University community, we have inherited Thomas Green Clemson's vision of this institution as a "high seminary of learning." Fundamental to this vision is a mutual commitment to truthfulness, honor, and responsibility, without which we cannot earn the trust and respect of others. Furthermore, we recognize that academic dishonesty detracts from the value of a Clemson degree. Therefore, we shall not tolerate lying, cheating, or stealing in any form.

### **Academic Integrity Policy**

1. Any breach of the principles outlined in the Academic Integrity Statement is considered an act of academic dishonesty.
2. Academic dishonesty is further defined as:
  - a) Giving, receiving, or using unauthorized aid on any academic work;
  - b) Plagiarism, which includes the copying of language, structure, or ideas of another and attributing the work to one's own efforts;
  - c) Attempts to copy, edit, or delete computer files that belong to another person or use of Computer Center account numbers that belong to another person without the permission of the file owner, account owner or file number owner;
3. All academic work submitted for grading contains an implicit pledge and may contain, at the request of an instructor, an explicit pledge by the student that no unauthorized aid has been received.
4. It is the responsibility of every member of the Clemson University community to enforce the Academic Integrity Policy.

### **Emergency Preparedness Statement:**

Emergency procedures have been posted in all buildings and on all elevators. Students should be reminded to review these procedures for their own safety. All students and employees should be familiar with guidelines from the Clemson Police Department. [Visit here for information about safety.](#)

### **Inclement Weather or Class Cancellation Statement:**

Any exam that was scheduled at the time of a class cancellation due to inclement weather will be given at the next class meeting unless contacted by the instructor. Any assignments due at the time of a class cancellation due to inclement weather will be due at the next class meeting unless contacted by the instructor. Any extension or postponement of assignments or exams must be granted by the instructor via email or Canvas within 24 hours of the weather-related cancellation.

**Disclaimer:** The plans and schedules contained in this syllabus represent a good-faith effort to inform you of the class structure, content, and policies. Changes to course structure may be necessitated by extenuating circumstance.

