



Instructor
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Term:	Fall 2017
Class Meeting Days:	OPEN
Class Meeting Hours:	OPEN
Class Location:	Online Dist. Course
Lab Location:	Online Dist. Course
Course Credits:	3

Course Overview

Welcome to Rangeland Herbivore Ecology and Management (RS 452). This course is intended to provide students with the foundation necessary to explore rangeland animal and habitat interactions. There is no textbook for this course. To cover this broad scope of subject matter, the course is structured into 10 different one to two week-long modules (see below). Each module is comprised of readings, video presentations, and 1-2 assignments. The course will also include a midterm examination, a grazing plan project, and a final examination.

Course Goals and Objectives

The goal of Rangeland Herbivore Ecology and Management is to study a complex variety of factors that determine how rangeland herbivores interact with their habitat and to explore how these interactions translate into challenges and opportunities for natural resource conservation and management. Upon successful completion of this course students will be able to:

1. Understand important linkages between animal performance, plant performance, and the major factors that drive each.
2. Understand interactions between large rangeland herbivores and their habitat and how these interactions translate into challenges and opportunities for managers and conservationists.
3. Understand traditional grazing strategies and the planning process as related to grazing management.
4. Be able to predict how management may influence plant and animal performance in order to meet management and conservation objectives.
5. Have the ability to develop a grazing management plan to meet specific objectives.

Course Prerequisites

RS300; LAND220 or LIFE220

Required Texts and Materials

There is no textbook required for this course. Required readings and videos will be provided online through Canvas.

Important Dates to Remember

Fall Classes Begin: Aug. 21, 2017
Midterm Examination: Oct. 16 - 22, 2017
Withdrawal Deadline: Oct. 21, 2017
Final Exam Week: Dec. 11 - 14, 2017

Course Schedule and/or Schedule of Assignments

Module 1 (1 Week) Aug. 21 – 27 Intro. to Herbivore Ecology and Large Rangeland Herbivores: Past to Present

Overview This module is intended to bring you up to date on the history of rangeland herbivore and plant interactions in North America. Europe will be discussed, but the Intermountain West and grasslands of North America will be the main area of discussion. Upon completion of this module, you should be able to: 1) Delineate and describe some of the basic interactions between plants and rangeland herbivores in the past, especially North America, and 2) Define some of the changes that have occurred on rangelands for herbivores over the last 100 to 200 years and some of the challenges that land managers face today.

Discussion Assignments 1) Introduce yourself to the class. (Due Aug. 27 at 11:59 PM MT) 2) How have the forage resources for herbivores changed in North America and the world over the last 100 to 200 years? What new challenges do herbivores and rangeland managers face? (Due Aug. 27 at 11:59 PM MT)

Introduction to Grazing Plan Project Assignment (Plan is due Dec. 10 at 11:59 PM MT).

Module 2 (2 Weeks) Aug. 28 – Sept. 10 Herbivory from the Plant's Perspective

Overview What do plants have up their sleeves to defend themselves against herbivores? How do different plants respond to defoliation, depending on species and other factors? How do plants uptake nutrients and allocate resources for growth? Upon completion of this module, you should be able to: 1) Outline basic plant chemistry and defenses against herbivory and 2) Describe basic plant growth and response to herbivory.

Discussion Assignment Are you surprised at the many different mechanisms plant have for surviving and defending against herbivory? In two paragraphs, describe 1) what you found interesting in this week's module and 2) does this change your view of rangeland plants? (Due Sept. 10 at 11:59 PM MT)

Outline of Grazing Plan Project Assignment (Due Sept. 10 at 11:59 PM MT)

Module 3 (1 Week) Sept. 11 - 17 Large Herbivore Adaptations and Anatomy: Herbivory from the Mammal's Perspective

Overview What are the differences between the digestive systems of rangeland herbivores? How are these herbivores classified? In this module gain understanding of the adaptations of different herbivores and their digestive systems. Upon completion of this module, you should be able to: 1) Recognize and describe different digestive systems and herbivore adaptations and 2) Classify herbivores and understand some of the basic evolutionary steps relating to ecophysiological adaptation.

Discussion Assignment How comfortable are you with herbivore digestive systems? Based on your readings and the presentations, please describe at least 5 new ideas, processes, or concepts that you discovered in this module that you found interesting. (Due Sep. 17 at 11:59 PM MT)

Homework Assignment Write a 1-page summary of Hofmann 1989 (Due Sep. 17 at 11:59 PM MT)

Module 4 (2 Weeks) Sep. 18 – Oct. 1 Large Herbivore Characteristics and Nuances: Grazers, Browsers, and Nutritional Ecology

Overview Grazing species focus on herbaceous plants, while browsers feed primarily on woody plants. However, the differences between these two types of feeders have to do with more than just the food they eat. Upon completion of this module you will be able to: 1) recognize and discuss the differences between grazers and browsers and 2) explain some of the nutritional ecology of ruminants.

Discussion Assignment Browsers and grazers are not the same. List at least 6 differences you thought were noteworthy between the two types of herbivores. Also, list five similarities between grazers and browsers. (Due Oct. 1 at 11:59 PM MT)

Homework Assignment Write a 1-page summary of Gordon 2003 (Due Oct. 1 at 11:59 PM MT)

Module 5 (2 Weeks) Oct. 2 – Oct. 15 The Large Herbivore Diet: Forage Intake, Quality, and Selection

Overview How does forage quality affect intake? Or, does it? Let's explore the nuances of different herbivore forages. Upon completion of this module, you should be able to: 1) outline the factors that affect forage intake and selection of forage by rangeland herbivores, 2) describe characteristics that affect forage quality, and 3) explain how to sample forage and proceed with a test and interpretation of results.

Discussion Assignment What affects forage quality? What did you learn from this module? List at least 6 new/interesting concepts or ideas that you discovered in Module 5. (Due at 11:59 PM MT on Oct. 15)

Midterm Exam Oct. 16 - 22

The Midterm Exam covers Modules 1 through 5. The Midterm Exam must be completed between 8 AM on Monday Oct. 17 and 11:59 PM MT on Sunday Oct. 22.

Module 6 (1 Week) Oct. 23 - 29 Large Herbivore Animal Production: Basics from Feeding to Marketing

Overview There is more to herbivore management than just feeding them. What are the energy and protein requirements of herbivores? What can you feed herbivores? Upon completion of this module, you should be able to: 1) explain basic components of energy balance, 2) describe basic principles of animal production, and 3) identify strategies for livestock marketing.

Discussion Assignment Does the proper handling and feeding of herbivores seem easy? Discuss in two paragraphs what appeared to you to be the most challenging aspects of properly feeding and handling herbivores such as cattle, sheep, or goats. (Due at 11:59 PM MT on Oct. 29)

Module 7 (2 Weeks) Oct. 30 – Nov. 12 Foraging Behavior of Large Herbivores including Plant Community Response and Ecological Impacts

Overview What is the linkage between herbivore foraging behavior and plant community status? Do all herbivores affect plant communities the same way? Does breed and type of livestock affect impacts? Upon completion of this module, you should be able to: 1) identify differences in herbivore foraging

behavior, 2) outline herbivore learning and post-ingestive feedbacks, 3) list principles of palatability, neophobia, forage preferences, and aversion, and 4) describe relationships between plant community dynamics and herbivory.

Discussion Assignment Will the information covered in this module help you manage rangeland herbivores? In three paragraphs, summarize what you felt like were the most relevant concepts/ideas from Module 7. (Due at 11:59 PM MT on Nov. 12)

Module 8 (2 Weeks) Nov. 13 - 26 Prescribed Grazing/Browsing Knowledge, Case Studies, and Challenges

Overview Managing the vegetation can sometimes be more difficult than managing the herbivore. But what do you do when you have to manage them both? What sort of grazing/browsing strategies already exist that might be useful for managing vegetation and adequately providing for herbivores? Upon completion of this module, you should be able to: 1) delineate common grazing/browsing systems, 2) identify challenges for managing herbivores, and 3) summarize practical grazing/browsing strategies and examples of vegetation management through herbivory.

Discussion Assignment Vegetation management is not that easy, but herbivores do it all the time. List the top 7 concepts/ideas you gleaned from this module. (Due at 11:59 PM MT Nov. 26)

Homework Assignment Choose either Briske et al. (2008) or Laca (2009) and write a 1-page summary (Due at 11:59 PM MT Nov. 26)

Module 9 (1 Week) Nov. 27 – Dec. 3 Prescribed Grazing/Browsing: Planning and Decision Making

Overview There are so many things to consider when developing a grazing plan. How many herbivores should go where....? When should herbivores be moved from one place to the next....? Which herbivores should be used to reach management objectives? Designing a grazing/browsing plan is complex, but this module will get you started. Upon completion of this module, you should be able to: 1) identify major components of an effective grazing/browsing plan, 2) utilize calculators and tools to plan sequences for grazing/browsing use of land/pastures, and 3) chart and outline a basic grazing/browsing plan.

Discussion Assignment Experiment with the Grazing and Hay Records Spreadsheet as well as the CSU Stocking Rate Calculator. In two paragraphs, explain what you did and how it worked it for you. Do you think this will help you manage your herbivores/rangelands? (Due at 11:59 PM MT Dec. 3)

Module 10 (1 Week) Dec. 4 - 10 Looking Ahead: The Future of Rangeland Herbivore Ecology and Management

Overview How easy is it to predict the future? What things should we be thinking out in order to make good management decisions? What can we learn from past mistakes? What can we do to ensure conservation and sustainability of land resource use? Upon completion of this module you should be able to: 1) summarize some of the potential trajectories for large herbivore management on rangelands in the near future, and 2) describe potential strategies that may allow rangeland managers to make good management decisions into the future.

Discussion Assignment In two paragraphs, summarize what you think will be the greatest challenges and opportunities for managing herbivores on rangelands over the next 5 to 10 years? (Due at 11:59 PM MT Dec. 10)

Grazing Plan Reminder: Grazing Plan Project Assignment (Plan is due Dec. 10 at 11:59 PM MT).

Final Exam Dec. 11 - 14

The Final Exam is comprehensive (Modules 1 through 10) and must be completed between 8 am on Monday Dec. 11 and 11:59 PM MT on Thursday Dec. 14.

Discussion Assignments

Students will be expected to complete 15 discussion assignments based on reading and video content from each module (150 points total). Grading of the discussion assignments will be based on:

1. Subject Knowledge (40%)
2. Quality of Interaction (30%)
3. Mechanics (30%)

Homework Assignments

Article Summaries (3): Students will be expected to complete a 1-page written summary for each of three different articles. Each summary is worth 20 pts. Each 1-page summary must include:

1. A summary of the main points of the reading (70%)
2. The student's impressions of and opinions about the article (30%)
3. The following statement (CSU Honor Pledge) followed by the student's signature - I pledge on my honor that I have not received or given any unauthorized assistance in this assignment.

Basis for Final Grade

Assessment		Percent of Final Grade
Discussion Assignments	(15)	30%
Midterm Exam	(1)	20%
Homework Assignments	(3)	15%
Grazing Plan	(1)	15%
Final Exam	(1)	20%
		100%

Grading will be based on the percentage of total points above earned by each student and on a straight scale of >90%=A, 80-89%=B, 70-79%=C, 60-69%=D, <60%=F. The '+' and '-' system will not be used in grading.

Course Policies

Late Work Policy

There are no make-ups discussion assignments, midterm exam, or final exam. Homework assignments turned in late will be assessed a penalty: a half-letter grade if it is one day late, or a full-letter grade for 2-7 days late. Homework assignments will not be accepted if overdue by more than seven days.

Extra Credit Policy

Extra credit questions may appear on exams. No other extra credit is available.

Disability Access

Colorado State University is committed to providing reasonable accommodations for all persons with disabilities. Students with disabilities who need accommodations must first contact Resources for Disabled Students before requesting accommodations from the professor. Resources for Disabled Students (RDS; <http://rds.colostate.edu/home>) is located in room 100 of the General Services Building. Their phone is (970) 491-6385 (V/TDD). Students who need accommodations in this course must contact the professor at the beginning of the semester to discuss needed accommodations.

Grades of "Incomplete"

Per university policy, an instructor may assign temporary grade of Incomplete to a student who demonstrates that he or she could not complete the requirements of the course due to circumstances beyond the student's control and not reasonably foreseeable. A student must be passing a course at the time that an Incomplete is requested unless the instructor determines that there are extenuating circumstances to assign an Incomplete to a student who is not passing the course. When an instructor assigns an Incomplete, he or she shall specify in writing using the Department Incomplete Grade Form the requirements the student shall fulfill to complete the course as well as the reasons for granting an Incomplete when the student is not passing the course. The instructor shall retain a copy of this statement in his or her grade records and provide copies to the student and the department head or his or her designee. (Section I.6 of the Academic Faculty and Administrative Professional Manual)

Attendance Policy

Exams must be taken during the scheduled dates. For those of you wishing to take the exams early, I will work with you to schedule exams for an earlier date if your personal schedule does not permit you to take your exam according to the course schedule. So, if you have a scheduling conflict let me know in advance of the exam. However, exams cannot be taken late. Since I post the exam answers online after the exam, I will not permit exams to be taken late. Do not miss an exam. Plan ahead. Complete all of your assigned readings and viewings prior to taking the exam. More information specific to individual exams will be provided in advance to each exam.

Instructors and departments are responsible for establishing attendance policies for classes and examinations. These policies must accommodate student participation in University-sanctioned extracurricular/co-curricular activities. Students must inform their instructors prior to the anticipated absence and take the initiative to make up missed work in a timely fashion. Instructors must make reasonable efforts to enable students to make up work which must be accomplished under the instructor's supervision (e.g., examinations, laboratories). In the event of a conflict in regard to this policy, individuals may appeal using established University procedures.

For the purposes of this regulation, University-sanctioned activities include competitions, events and professional meetings in which students are officially representing the institution. Appropriate sanctioned activities include:

- a. Intercollegiate athletics;
- b. Collegiate club sports and competitions;
- c. Conferences and workshops recognized by the University not related to academics;
- d. Commitments on behalf of the University (ASCSU, band, etc.); and
- e. Professional activities recognized by the University related to academics.

Department heads or their designated representatives must approve sanctioned professional and departmental activities. Other sanctioned activities must be approved by the appropriate program director on record with the Division of Student Affairs offices or the Department of Athletics.

Religious Accommodation

Participation in official University activities, e.g., an out-of-town athletic event, or special religious observances may provide a legitimate reason for an excused absence. The student is responsible for discussing this with the instructor at the beginning of the semester.

Final Exam Policy

Final examination week is part of the regular semester. Student attendance shall be consistent with University policy.

If a student has three or more final examinations (not classes) scheduled for the same day or if conflicts of examination times occur, the student may negotiate a time change with the instructors involved. If the parties involved cannot find a mutually agreeable time, the Registrar's Office indicates which courses must be changed. Note: The Registrar's Office must be notified at least one week prior to Final Examination Week to allow instructors time to make appropriate accommodations. It is the student's responsibility to initiate negotiations.

Any student who has a conflict with the examination schedule must inform the instructor as soon as possible before the examination. If an agreement cannot be reached between the instructor and student as to the appropriateness of a make-up examination the student should appeal to the department head. <http://www.registrar.colostate.edu/final-exams>

Professionalism Policy

When emailing the instructor, please include your full name, CSU ID, and the course number in your email.

Academic Integrity

The Department of Forest and Rangeland Stewardship takes academic integrity seriously. At minimum, academic integrity means that no one will use another's work as their own. The CSU writing center defines plagiarism this way:

Plagiarism is the unauthorized or unacknowledged use of another person's academic or scholarly work. Done on purpose, it is cheating. Done accidentally, it is no less serious. Regardless of how it occurs, plagiarism is a theft of intellectual property and a violation of an ironclad rule demanding "credit be given where credit is due."

Source: (Writing Guides: Understanding Plagiarism.

<http://writing.colostate.edu/guides/guide.cfm?guideid=17>)

If you plagiarize in your work you could lose credit for the plagiarized work, fail the assignment, or fail the course. Each instance of plagiarism, classroom cheating, and other types of academic dishonesty will be addressed according to the principles published in the CSU General Catalog (under "Academic Integrity/Misconduct: <http://catalog.colostate.edu/general-catalog/policies/students-responsibilities/> .)

Of course, academic integrity means more than just avoiding plagiarism. It also involves doing your own reading and studying. It includes regular class attendance, careful consideration of all class materials, and engagement with the class and your fellow students. Academic integrity lies at the core of our common goal: to create an intellectually honest and rigorous community. Because academic integrity, and the personal and social integrity of which academic integrity is an integral part, is so central to our mission as students, teachers, scholars, and citizens, we will ask to you sign the CSU Honor Pledge as part of completing all of our major assignments. While you will not be required to sign the honor pledge, we will ask each of you to write and sign the following statement on your papers and exams:

"I have not given, received, or used any unauthorized assistance."

Title IX Information

CSU's Student Sexual Harassment and Violence policy, following national guidance from the Office of Civil Rights, requires that faculty follow CSU policy as a "mandatory reporter" of any personal disclosure of sexual harassment, abuse, and/or violence related experiences or incidents shared with the faculty member in person, via email, and/or in classroom papers or homework exercises. These disclosures include but are not limited to reports of personal relational abuse, relational/domestic violence, and stalking. While faculty are often able to help students locate appropriate channels of assistance on campus (e.g., see the CSU Health Network link below), disclosure by the student to the faculty member requires that the faculty member inform appropriate CSU channels to help ensure that

the student's safety and welfare is being addressed, even if the student requests that the disclosure not be shared.

For counseling support and assistance, please see the CSU Health Network, which includes a variety of counseling services that can be accessed at: <http://www.health.colostate.edu/>. And, the Sexual Assault Victim Assistance Team is a confidential resource for students that does not have a reporting requirement and that can be of great help to students who have experienced sexual assault. The web address is <http://www.wgac.colostate.edu/need-help-support>.

Source: <http://oeo.colostate.edu/title-ix-sexual-assault>

Non-Discrimination Statement

Colorado State University does not discriminate on the basis of race, age, creed, color, religion, national origin or ancestry, sex, gender, disability, veteran status, genetic information, sexual orientation, gender identity or expression, or pregnancy. The University complies with the Civil Rights Act of 1964, as amended, related Executive Orders 11246 and 11375, Title IX of the Education Amendments Act of 1972, Sections 503 and 504 of the Rehabilitation Act of 1973, Section 402 of the Vietnam Era Veterans' Readjustment Assistance Act of 1974, as amended, the Age Discrimination in Employment Act of 1967, as amended, The Pregnancy Discrimination Act of 1978, Americans with Disabilities Act of 1990, the Civil Rights Act of 1991, the ADA Amendments Act of 2008, the Genetic Information Nondiscrimination Act of 2008, and all civil rights laws of the State of Colorado. Accordingly, equal opportunity of employment and admission shall be extended to all persons. The University shall promote equal opportunity and treatment in employment through a positive and continuing affirmative action program for ethnic minorities, women, persons with disabilities, and veterans. The Office of Equal Opportunity is located in 101 Student Services. Source: <http://oeo.colostate.edu/non-discrimination-statement>

Library & Research Help

The CSU Libraries Help Desk provides research and technical assistance either in person at Morgan Library or by phone at 970-491-1841. Jocelyn Boice is the librarian supporting this course. Contact her by email at jocelyn.boice@colostate.edu or by phone at 970-491-3882 to ask questions or set up an appointment for in-depth research help.

System, Multimedia, and Software Requirements

Having trouble with the multimedia in this course? See the solutions below. Also, it is highly recommended that you access your course via a high-speed Internet connection.

- Problems with opening PDFs?
 - Download [Adobe Reader](#).
- Canvas acting funny?
 - Download the correct version of [Java](#) for Canvas.
- YouTube videos not playing?
 - Download [Flash Player](#).
- Videos not opening or playing on your Mac?
 - Download [Windows Media Components for QuickTime](#).
- Can't open content created with Microsoft Office Products? Download the following viewers:
 - [Word Viewer](#)
 - [PowerPoint Viewer](#)
 - [Excel Viewer](#)

- [Microsoft Office Compatibility Pack for Word, Excel, and PowerPoint File Formats](#)
- Still having issues:
 - Call the CSU Help Desk at 970-491-7276 or [Email Help Desk Support](#)

You must have speakers installed and working properly on your computer before beginning the course.

You may need access to Microsoft Word, PowerPoint, and/or Excel to complete assignments. If you do not have access to the Microsoft Office applications, you may use one of the following free resources that allow you to save your files with Microsoft Office file extensions (.doc, .docs, .ppt, .xls.):

- [Google Apps for CSU](#)—a free, outsourced communications suite endorsed by The University Technology Fee Advisory Board (UTFAB)
- [Open Office](#)—an open source productivity suite

Technical Support

Need technical assistance with your Canvas course? Try the following:

- Visit the [Help Desk](#) web page to troubleshoot common browser and Java issues.
- Call 970-491-7276.
- Email [Help Desk Support](#).