AGRI 0020 - INTRODUCTION TO WILDLAND ECOLOGY AND RANGE SCIENCE

Catalog Description

Hours: 90 (36 lecture, 54 laboratory)
Description: Basic range management and improvement practices. Proper utilization of rangeland resources, management for sustainable human and environmental values, use by wild and domestic animals, and historical and legal changes in rangeland management. Overview of multiple use principles—maintenance and improvement of range plant communities, conserving biological diversity and environmental quality in rangelands. (CSU)

Course Student Learning Outcomes

- CSLO #1: Students will be able to classify five major concepts of range management.
- CSLO #2: Students will be able to identify cool and warm season forages.

Effective Term

Fall 2026

Course Type

Credit - Degree-applicable

Contact Hours

90

Outside of Class Hours

72

Total Student Learning Hours

162

Course Objectives

Upon successful completion of this course, the student will be able to:

Lecture Objectives:

1. Classify the five major concepts of range management and list products from U.S. rangeland managed under the policy of "multiple use".
2. Distinguish the major characteristics, forage species, and location on a map of the major U.S. range types.
3. Discriminate between cool season and warm season forages regarding growth and quality characteristics important to range management.
4. Classify the health of rangelands given different scenarios regarding plant species composition and soil health.
5. Judge range livestock production and be able to calculate forage requirements on an animal use basis
6. Conduct a range plant inventory for grasses, shrubs, and trees and evaluate stocking rates based upon those inventories.
7. Evaluate various rangeland lease scenarios and be able to articulate the benefits and liabilities of these methods.
8. Evaluate the best grazing method given particular scenarios regarding range type, animal type, and economic limitations.
9. Evaluate and recommend methods of improving livestock distribution on rangelands given conditions of range type, animal type, climate, and economic limitations.
10. Evaluate methods of improving rangelands given conditions of range type, range health, climate, and economic limitations.
11. Investigate methods of improving rangelands given conditions of range type, range health, climate, and economic limitations.
12. Explain the responsibilities and requirements of a Certified Range Manager and the route to secure this license from the State of California.

Laboratory Objectives:

1. **Remember/Identify:** Participate in a campus field trip to recognize and identify local rangeland characteristics and ecological features.
2. **Understand/Describe:** Interpret map exercises and analyze a virtual tour to differentiate between major U.S. range types and their distribution patterns.
3. **Apply/Classify:** Collect plant specimens and classify them according to growth characteristics, life cycle, and ecological significance.
4. **Analyze/Examine:** Conduct field exercises to assess rangeland health by examining soil conditions, vegetation cover, and ecosystem indicators.
5. **Calculate/Apply:** Perform forage inventory measurements and apply appropriate calculations to determine sustainable stocking rates.
6. **Analyze/Compare:** Examine case studies to compare and contrast different grazing systems and their impacts on rangeland ecosystems.
7. **Create/Design:** Synthesize course concepts to design a comprehensive ranch improvement plan that addresses ecological and economic considerations.
8. **Evaluate/Discuss:** Engage with a guest speaker from a professional rangeland management organization to evaluate current industry practices and emerging trends.
9. **Apply/Implement:** Execute off-campus field work to implement rangeland assessment techniques in diverse environmental settings.

General Education Information

- Approved College Associate Degree GE Applicability
  - AA/AS - Natural Sciences
  - AA/AS - Natural Sciences Laboratory
- CSU GE Applicability (Recommended-requires CSU approval)
- Cal-GETC Applicability (Recommended - Requires External Approval)
  - Cal-GETC 5B - Biological Science
  - Cal-GETC 5C - Laboratory Science
- IGETC Applicability (Recommended-requires CSU/UC approval)

Articulation Information

- CSU Transferable

Methods of Evaluation

- Classroom Discussions
  - Example: Students participate in discussions analyzing real-world rangeland scenarios, identifying plant species composition, and evaluating rangeland health Group discussions on comparing grazing methods across different range types and animal types Debates on the merits of various rangeland improvement strategies considering ecological and economic factors
- Essay Examinations
  - Example: Compare and contrast various rangeland lease arrangements, analyzing benefits and drawbacks Explain the ecological principles behind range improvement techniques for degraded landscapes Analyze the responsibilities and requirements of a Certified Range Manager in California Discuss the implications of climate change on rangeland management strategies Explain how soil health indicators relate to overall rangeland ecosystem function
- Objective Examinations
  - Example: Multiple-choice questions identifying major U.S. range types on maps Matching exercises connecting range types with their characteristic forage species True/false questions about cool season versus warm season forage characteristics Fill-in-the-blank questions about the five major concepts of range management Multiple-choice questions identifying products from U.S. rangelands under "multiple use" policy
- Problem Solving Examinations
  - Example: Calculate animal use days based on forage production and requirements Develop a grazing management plan for a given scenario with specific constraints Create a rangeland improvement strategy within economic limitations Solve distribution problems using water development, fencing, and other improvements Design monitoring protocols to assess rangeland health over time
- Reports
  - Example: Research paper on innovative rangeland improvement methods Case study analysis of successful range management strategies Technical report on forage inventory results from field exercises Economic analysis comparing different rangeland lease arrangements Management plan for improving degraded rangeland under specific constraints Professional development plan outlining steps to become a Certified Range Manager in California
- Skill Demonstrations
  - Example: Field identification of range plants (grasses, shrubs, trees) in various ecosystems Demonstration of range inventory techniques and data collection methods Calculation of proper stocking rates based on forage availability Presentation of methods to improve livestock distribution on a sample rangeland Demonstration of range condition assessment techniques

Repeatable

No

Methods of Instruction

- Laboratory
- Lecture/Discussion
- Distance Learning

Lab:

1. Activity Example: Range Plant Identification and Inventory Field Lab Instructor Role: Demonstrate proper plant identification techniques in the field Guide students through sampling methods (quadrat, transect, etc.) Supervise data collection and provide feedback on identification accuracy Lead discussion on calculating stocking rates based on collected data Student Experience: Hands-on identification of range plants using field guides and keys Practice sampling techniques across different range sites Record data on species composition and abundance Calculate carrying capacity and recommended stocking rates based on collected data Example Meeting Criteria: Students spend three hours in a nearby rangeland site collecting plant data using quadrat sampling along transects. They identify key grass, forb, and shrub species, estimate percent cover, and determine forage production. After data collection, students calculate animal unit months (AUMs) the site can support and compare their results with historical stocking records. The instructor provides immediate feedback on plant identification and sampling technique, guiding students through challenging identifications.

Lecture:

1. Range Types and Regions Interactive Mapping Session Instructor Role: Present key characteristics of major U.S. range types with visual aids Facilitate discussion on regional variations in rangeland ecosystems Guide comparative analysis of indicator species across range types Ask probing questions to deepen understanding of ecological relationships Student Experience: Engage with maps and visual resources showing range type distributions Participate in discussions identifying diagnostic features of each range type Compare and contrast characteristic forage species between regions Collaborate with peers to analyze case studies of different range types Example Meeting Criteria: The instructor begins with a 30-minute presentation on the six major U.S. range types, highlighting their geographical distribution, climate patterns, and indicator species. Students then break into small groups and work with large U.S. maps to outline range type boundaries and list 3-5 key forage species for each region. Groups present their findings, discussing similarities and differences between adjacent range types. The session concludes with a whole-class discussion about how these range types influence management decisions and stocking strategies.

Distance Learning

1. Virtual Range Health Assessment Case Studies Instructor Role: Develop detailed case studies with photos, soil test results, and vegetation data Create instructional videos demonstrating range health assessment protocols Facilitate asynchronous discussion forums for case analysis Provide timely feedback on student assessments and recommendations Student Experience: Analyze virtual case studies through an online learning platform Apply range health indicators to evaluate presented scenarios Engage with peers through structured discussion forums Submit detailed health assessments with management recommendations Example Meeting Criteria: Students access an online module containing five case studies of rangelands with varying health conditions. Each case includes high-resolution photographs of vegetation and soil conditions, species composition data, soil test results, and land use history. Students independently analyze each case using the "Interpreting Indicators of Rangeland Health" protocol, classifying

each site into appropriate health categories and justifying their assessments. They post their analyses to the course discussion board, where they must comment on at least two classmates' assessments, comparing their conclusions and discussing any differences. The instructor moderates the discussion, provides clarification on assessment criteria, and offers a video-recorded summary of the "correct" assessments with explanation of the reasoning process.

Typical Out of Class Assignments Reading Assignments

Textbook Chapters on the Five Major Concepts of Range Management and Multiple Use Policy Critical Thinking Assignment: After reading the assigned textbook chapters, analyze a local rangeland area and evaluate how well it exemplifies or contradicts each of the five major concepts of range management. Develop a proposal for how multiple-use policy might be better implemented in this area, addressing potential conflicts between stakeholders. Consider how historical management approaches have shaped current conditions and what trade-offs exist between different management objectives.

Writing, Problem Solving or Performance

Cost-benefit analysis of different rangeland lease options Decision matrix for selecting appropriate grazing methods under various constraints Written evaluation of distribution improvement techniques based on given scenarios Problem sets applying economic analysis to rangeland improvement methods Response paper on the ethical responsibilities of Certified Range Managers

Other (Term projects, research papers, portfolios, etc.)

Practice interviews with ranchers about lease arrangements On-site evaluation of various grazing methods at demonstration sites Field problem-solving exercise to improve livestock distribution Design project for an ideal grazing system for a specific scenario Research proposal for improving livestock distribution in challenging terrain

Required Materials

- Rangeland Ecology, Management and Conservation Benefits
  - Author: Squires, V.
  - Publisher: Nova Science Publishers
  - Publication Date: 2015
  - Text Edition: ISBN: 978-1-63482-584-9
  - Classic Textbook?: Yes
  - OER Link:
  - OER:
- Rangeland Wildlife Ecology and Conservation
  - Author: McNew, Dahlgren, Beck
  - Publisher: Springer
  - Publication Date: September 2023
  - Text Edition: 1st
  - Classic Textbook?: Yes
  - OER Link:
  - OER: https://doi.org/10.1007/978-3-031-34037-6
- Laboratory Manual for AGRI 0020
  - Author: Instructor Developed
  - Publisher:
  - Publication Date: 2026
  - Text Edition:
  - Classic Textbook?: No
  - OER Link:
  - OER:

Other materials and-or supplies required of students that contribute to the cost of the course.

Field notebook, compass, basic calculator, appropriate field attire, ex: mud boots