DEPARTMENT OF FOREST AND RANGELAND STEWARDSHIP

Office in Forestry Building, Room 123
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Undergraduate Majors

- Major in Fire and Emergency Services Administration
- Major in Forestry
  - Forest Biology Concentration
  - Forest Fire Science Concentration
  - Forest Management Concentration
  - Forestry-Business Concentration
- Major in Natural Resources Management
- Major in Rangeland Ecology
  - Conservation and Management Concentration
  - Range and Forest Management Concentration
  - Restoration Ecology Concentration

Minors

- Minor in Ecological Restoration
- Minor in Forestry
- Minor in Range Ecology
- Minor in Spatial Information Management

Interdisciplinary Minors

- Interdisciplinary Minor in Conservation Biology

Graduate

Graduate Programs in Forest and Rangeland Stewardship

The department offers graduate programs leading to Master of Science and Doctor of Philosophy degrees in Forest Sciences and Rangeland Ecosystem Science, and to Master of Natural Resources Stewardship with specializations in Ecological Restoration, Forest Sciences, and Rangeland Ecosystems. Students interested in graduate work should refer to the Graduate and Professional Bulletin and the Department of Forest and Rangeland Stewardship (http://warnercnr.colostate.edu/frs-graduate-study/graduate-program).

Master Programs

- Master of Science in Forest Sciences, Plan A*
- Master of Science in Forest Sciences, Plan B*
- Master of Natural Resources Stewardship, Plan C, Ecological Restoration Specialization
- Master of Natural Resources Stewardship, Plan C, Forest Sciences Specialization
- Master of Natural Resources Stewardship Plan C, Rangeland Ecology and Management Specialization
- Master of Natural Resources Stewardship Plan C, Sustainable Military Lands Management Specialization (No new students are being accepted into this specialization)
- Master of Science in Rangeland Ecosystem Science, Plan A*
- Master of Science in Rangeland Ecosystem Science, Plan B*

Ph.D.

- Ph.D. in Forest Sciences*
- Ph.D in Rangeland Ecosystem Science*

* Please see department for program of study.

Courses

Subjects in this department include: Fire and Emergency Service Administration (FESA), Forest and Rangeland Stewardship (F), select Natural Resources (NR), and Rangeland Ecosystem Science (RS).

Fire and Emergency Service Administration (FESA)

FESA 310 Fire Service Leadership Credits: 3 (0-0-3)
Course Description: Theory, practice, and application of ethical leadership in public safety; developing personal ethics and leadership skills and abilities.
Prerequisite: None.
Registration Information: Offered as an online course only.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: No.
FESA 330  Industrial Processes and Fire Protection  Credits: 3 (0-0-3)
Course Description: Industrial processes and fire protection managed by 
fire and safety personnel.
Prerequisite: None.
Registration Information: Offered as an online course only.
Term Offered: Summer (even years).
Grade Mode: Traditional.
Special Course Fee: No.

FESA 331  Structure Influence on Tactics and Strategy  Credits: 3 (3-0-0)
Course Description: How construction type, alterations, design and 
materials influence a building's reaction to fire. Fireground influence on 
tactics and strategy.
Prerequisite: None.
Registration Information: Offered as an online course only.
Terms Offered: Fall, Summer.
Grade Mode: Traditional.
Special Course Fee: No.

FESA 333  Proposals/Reports in Fire Service Management  Credits: 3 (0-0-3)
Course Description: Process of preparing reports and developing a 
proposal supported by research. Introduction to research techniques, 
Internet and library use; conventions of documentation.
Prerequisite: None.
Registration Information: Offered as an online course only.
Terms Offered: Fall, Spring.
Grade Mode: Traditional.
Special Course Fee: No.

FESA 334  Orientation to Experiential Learning  Credit: 1 (0-0-1)
Course Description: Demonstration of knowledge, skill, and professional 
experience for the purpose of enhancing documentation and career 
development skills.
Prerequisite: None.
Registration Information: Offered as an online course only.
Terms Offered: Fall, Spring.
Grade Mode: Traditional.
Special Course Fee: No.

FESA 335  Trends in Fire Science Technologies  Credits: 3 (0-0-3)
Course Description: Analytical tools designed to evaluate, align, select, 
and implement emerging fire science technologies.
Prerequisite: None.
Registration Information: Offered as an online course only.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.

FESA 336  Fire Emergency Services Administration  Credits: 3 (0-0-3)
Course Description: Fire and emergency service administrative structures 
and processes. Examination of management and leadership models and 
applications.
Prerequisite: None.
Registration Information: Offered as an online course only.
Terms Offered: Fall, Spring.
Grade Mode: Traditional.
Special Course Fee: No.

FESA 337  Policy and Public Administration  Credits: 3 (0-0-3)
Course Description: Political and legal foundations of fire and emergency 
services. Public administration concepts, decision making and policy 
development.
Prerequisite: FESA 334.
Registration Information: Offered as an online course only.
Term Offered: Fall, Spring.
Grade Mode: Traditional.
Special Course Fee: No.

FESA 338  Essentials of Emergency Management  Credits: 3 (0-0-3)
Course Description: Emergency management theory; mitigation, planning, 
response, and recovery in large-scale incidents. Development/operation 
of emergency operation centers.
Prerequisite: None.
Registration Information: Offered as an online course only.
Terms Offered: Fall, Spring.
Grade Mode: Traditional.
Special Course Fee: No.

FESA 339  Incident Command Systems  Credits: 3 (0-0-3)
Course Description: Theory and application of incident command 
systems (ICS) to the command and coordination of major emergency 
operations.
Prerequisite: FESA 334.
Registration Information: Offered as an online course only.
Term Offered: Summer.
Grade Mode: Traditional.
Special Course Fee: No.

FESA 341  Fire Officer I-A  Credits: 3 (3-0-0)
Course Description: Fire officer competencies at the supervisory level of 
performance, as confirmed by NFPA Standard 1021, Level I, 4.1 to 4.4.
Prerequisite: None.
Registration Information: Enrollment in FESA program or written consent 
of instructor. Offered as an online course only.
Term Offered: Fall (odd years).
Grade Mode: Traditional.
Special Course Fee: No.

FESA 342  Fire Officer I-B  Credits: 3 (3-0-0)
Course Description: Fire officer competencies at the supervisory level of 
performance, as confirmed by NFPA Standard 1021, Level II, 4.5 to 4.7.
Prerequisite: FESA 341 with a minimum grade of C.
Registration Information: Offered as an online course only.
Term Offered: Fall (odd years).
Grade Mode: Traditional.
Special Course Fee: No.

FESA 431  Emergency Medical Services Management  Credits: 3 (0-0-3)
Course Description: Emergency medical service models, design 
implementation, evaluation. Interactions with health care systems, public 
policy and public health systems.
Prerequisite: FESA 432 and FESA 433.
Registration Information: Offered as an online course only.
Term Offered: Spring (odd years).
Grade Mode: Traditional.
Special Course Fee: No.
FESA 432 Fire and Emergency Services Budgeting Credits: 3 (0-0-3)
Course Description: Application of emergency service budgeting systems with emphasis on revenues, public financial controls, capital funding and performance measures.
Prerequisite: FESA 333 and FESA 336.
Registration Information: Offered as an online course only.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: No.

FESA 433 Fire and Emergency: Human Resources Credits: 3 (0-0-3)
Course Description: Theory, practice, and models of human resources applied to emergency organizations; workforce development, HR functions, and labor relation.
Prerequisite: FESA 333 and FESA 336.
Registration Information: Offered as an online course only.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.

FESA 434 Training Program Management Credits: 3 (0-0-3)
Course Description: Development of agency training and education programs. Utilization of training and education practices, resources, facilities and technologies.
Prerequisite: FESA 432 and FESA 433.
Registration Information: Offered as an online course only.
Term Offered: Spring (even years).
Grade Mode: Traditional.
Special Course Fee: No.

FESA 435 Volunteer/Combination Organization Management Credits: 3 (0-0-3)
Course Description: Development and management of fire and emergency service organizations with volunteer and combination resources.
Prerequisite: FESA 432 and FESA 433.
Registration Information: Offered as an online course only.
Term Offered: Fall (even years).
Grade Mode: Traditional.
Special Course Fee: No.

FESA 436 Fire Protection Through Model Building Codes Credits: 3 (0-0-3)
Course Description: Overview of the most current fire codes that are used across the United States. Discussion of fire inspection methodology and enforcement practices.
Prerequisite: None.
Registration Information: Offered as an online course only.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.

FESA 437 Fire and Emergency: Legal Considerations Credits: 3 (0-0-3)
Course Description: Fire Service in relation to the complex legal system of the United States, individual states and local jurisdictions.
Prerequisite: FESA 432 and FESA 433.
Registration Information: Offered as an online course only.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: No.

FESA 438 Prevention Program Management Credits: 3 (0-0-3)
Course Description: Design, implementation, and evaluation of fire and risk prevention programs using education, engineering, and enforcement approaches.
Prerequisite: FESA 432 and FESA 433.
Registration Information: Offered as an online course only.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.

FESA 441 Fire Officer II-A Credits: 3 (3-0-0)
Course Description: Fire officer competencies at the supervisory/managerial level of performance, as confirmed by NFPA Standard 1021, Level II, 5.1 to 5.4.
Prerequisite: FESA 342 with a minimum grade of C.
Registration Information: Offered as an online course only.
Term Offered: Fall (even years).
Grade Mode: Traditional.
Special Course Fee: No.

FESA 442 Fire Officer II-B Credits: 3 (3-0-0)
Course Description: Fire officer competencies at the supervisory/managerial level of performance, as confirmed by NFPA Standard 1021, Level II, 5.5 to 5.7.
Prerequisite: FESA 441 with a minimum grade of C.
Registration Information: Offered as an online course only.
Term Offered: Fall (even years).
Grade Mode: Traditional.
Special Course Fee: No.

FESA 467 Integrated Management Simulation Credits: 3 (0-0-3)
Course Description: Integration management and administrative knowledge and skills in the development of a fire and emergency service management simulation.
Prerequisite: FESA 432 and FESA 433.
Registration Information: Offered as an online course only.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.

FESA 492 Seminar Credits: Var[1-3] (0-0-0)
Course Description: Discussion and documentation of professional experience in fire and emergency services.
Prerequisite: None.
Registration Information: Written consent of instructor. Offered as an online course only.
Terms Offered: Fall, Spring.
Grade Mode: S/U Sat/Unsat Only.
Special Course Fee: No.

FESA 495 Independent Study Credits: Var[1-6] (0-0-0)
Course Description: Prerequisite: None.
Registration Information: Admission to the FESA B.S. program; written consent of instructor. Offered as an online course only.
Terms Offered: Fall, Spring, Summer.
Grade Mode: S/U Sat/Unsat Only.
Special Course Fee: No.
Forest and Rangeland Stewardship (F)

F 224 Wildland Fire Measurements Credit: 1 (0-2-0)
Course Description: Wildland fire control and use measurements: fuels, weather, topography, fire behavior, and fire ecology.
Prerequisite: None.
Registration Information: Required field trips.
Term Offered: Fall.
Grade Modes: S/U within Student Option, Trad within Student Option.
Special Course Fee: No.

F 230 Forestry Field Measurements Credits: 2 (0-4-0)
Course Description: Develop field skills using maps, compasses, and aerial photos; photo interpretation; tree and stand measurements; stand volume and value estimates.
Prerequisite: None.
Term Offered: Summer.
Grade Modes: S/U within Student Option, Trad within Student Option.
Special Course Fee: No.

F 310 Forest and Rangeland Ecogeography Credits: 3 (2-2-0)
Also Offered As: RS 310.
Course Description: Distribution of wildland plant communities and identification of important grasses, forbs, shrubs, and trees common in North America.
Prerequisite: BZ 101 or BZ 104 or BZ 110 or BZ 120 or LIFE 102.
Registration Information: Must have concurrent registration in F 312.
Must register for lecture and laboratory. Credit not allowed for both F 310 and RS 310.
Terms Offered: Fall, Spring.
Grade Mode: Traditional.
Special Course Fee: No.

F 311 Forest Ecology Credits: 3 (3-0-0)
Course Description: Relationships of ecological concepts to the dynamics of forest ecosystems.
Prerequisite: LIFE 320 or LAND 220 or LIFE 220.
Terms Offered: Fall, Spring.
Grade Modes: S/U within Student Option, Trad within Student Option.
Special Course Fee: No.

F 312 Dendrology Lab Credit: 1 (0-2-0)
Course Description: Identification of characteristic trees common to North American forests.
Prerequisite: None.
Registration Information: Must have concurrent registration in F 310.
Terms Offered: Fall, Spring.
Grade Mode: Traditional.
Special Course Fee: No.

F 321 Forest Biometry Credits: 3 (2-2-0)
Course Description: Measurement and estimation of timber in logs, trees, and stands. Sampling with varying probabilities.
Prerequisite: (NR 220 and F 230) and (STAT 201 or STAT 301) and (MATH 141 or MATH 155).
Registration Information: Must register for lecture and laboratory. Required field trips.
Term Offered: Fall.
Grade Modes: S/U within Student Option, Trad within Student Option.
Special Course Fee: Yes.

F 322 Economics of the Forest Environment Credits: 3 (3-0-0)
Course Description: Economic principles and techniques applied to forested environments.
Prerequisite: AREC 202 or ECON 202 or ECON 240 or AREC 240.
Terms Offered: Fall, Spring.
Grade Modes: S/U within Student Option, Trad within Student Option.
Special Course Fee: No.

F 324 Fire Effects and Adaptations Credits: 3 (3-0-0)
Course Description: Introduction to fire ecology including fire history, ecosystem effects, and organism responses.
Prerequisite: LIFE 320 or LAND 220 or LIFE 220.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.

F 325 Silviculture Credits: 3 (3-0-0)
Course Description: Principles of silviculture and their application to major forest types of United States.
Prerequisite: F 230 and F 311 and NR 220.
Registration Information: Credit not allowed for both F 325 and NR 326.
Term Offered: Spring.
Grade Modes: S/U within Student Option, Trad within Student Option.
Special Course Fee: Yes.

F 326 Wildland Fire Behavior and Management Credits: 3 (3-0-0)
Course Description: Physical and managerial principles influencing fire, how fires shape our forests and approaches used to manage wildland fire.
Prerequisite: LAND 220 or LIFE 220 or LIFE 320.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: Yes.

F 330 Timber Harvesting and the Environment Credits: 3 (2-2-0)
Course Description: Principles of timber harvesting and effects of logging on the environment.
Prerequisite: F 230 or F 321.
Registration Information: Must register for lecture and laboratory. Required field trips.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.

F 331 Wood Products in Society Credits: 3 (2-2-0)
Course Description: Role of wood products in society; spectrum of wood products; some field trips.
Prerequisite: None.
Registration Information: Must register for lecture and laboratory. Required field trips.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: No.

F 421 Forest Stand Management Credits: 4 (3-3-0)
Course Description: Forest management plan preparation: forest condition and health assessment; evaluation of silvicultural treatments; implementation and monitoring.
Prerequisite: F 230 and F 321 and F 322 and F 325.
Registration Information: Must register for lecture and laboratory.
Term Offered: Fall.
Grade Modes: S/U within Student Option, Trad within Student Option.
Special Course Fee: Yes.
F 422  Quantitative Methods in Forest Management  Credits: 3 (2-2-0)
Course Description: Design and analysis of optimization and nonoptimization models in forest managerial operations.
Prerequisite: F 321 and F 322.
Registration Information: Must register for lecture and laboratory.
Term Offered: Fall.
Grade Modes: S/U within Student Option, Trad within Student Option.
Special Course Fee: No.

F 425  Advanced Wildland Fire Behavior and Management  Credits: 3 (3-0-0)
Course Description: Advanced strategies, tools, and techniques for wildland fire management: prediction, prevention, suppression, and use for resource benefit.
Prerequisite: F 326 and NR 319.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.

F 430  Forestry Field Practices  Credits: 3 (1-4-0)
Course Description: Forestry field course, S212 saw certification, collect stand inventory data, develop and implant stand prescription, and harvest and process trees.
Prerequisite: F 330 and F 421.
Registration Information: Must register for lecture and laboratory. Required field trips.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: Yes.

F 466  Urban and Community Forestry  Credits: 3 (3-0-0)
Also Offered As: HORT 466.
Course Description: Policies and management of publicly and privately owned community forests in urbanized areas.
Prerequisite: F 310 or RS 310 or HORT 221.
Registration Information: Credit not allowed for both F 466 and HORT 466.
Term Offered: Fall (odd years).
Grade Mode: Traditional.
Special Course Fee: No.

F 487  Professional Forestry Internship  Credits: Var[3-12] (0-0-0)
Course Description: Professional-level field experience with forestry organization.
Prerequisite: None.
Registration Information: Written consent of department chair.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.

F 495  Independent Study  Credits: Var[1-18] (0-0-0)
Course Description: Prerequisite: None.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.
F 540 Fuels, Vegetation, and Fire Management Credits: 3 (2-3-0)
Course Description: Develop, test and display the impact of alternative fuels and vegetation treatments on vegetation development, fuels and fire behavior.
Prerequisite: None.
Registration Information: Admission to the Continuing Education in Fuels Management program through the Office of Conference Services.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Traditional.
Special Course Fee: No.

F 541 Data Analysis/Interpretation-Fire Managers Credits: 3 (3-0-0)
Course Description: Knowledge and skills for complex analyses of fire information.
Prerequisite: None.
Registration Information: Employment as a wildfire manager. Offered as an online course only.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: No.

F 542 Wildland Fire Economics and Management Credits: 3 (3-0-0)
Course Description: Managerial economics and management techniques applied to wildland fire situations.
Prerequisite: None.
Registration Information: Employment as wildland fire manager.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.

F 544 Decision Methods for Fire Managers Credits: 3 (3-0-0)
Course Description: Application of decision methods, including optimization techniques, finance and decision trees to initial attack and fuels management problems.
Prerequisite: None.
Registration Information: Written consent of instructor.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Traditional.
Special Course Fee: No.

F 593 Seminar-Fire Science Credit: 1 (0-0-1)
Course Description: 
Prerequisite: None.
Term Offered: Fall.
Grade Mode: Instructor Option.
Special Course Fee: No.

F 624 Fire Ecology Credits: 3 (3-0-0)
Course Description: Fire in forest and range ecosystems; principles and techniques for evaluating fire effects on vegetation, soils, watersheds, and wildlife.
Prerequisite: ECOL 505 or F 310 or F 311 or LIFE 320 or NR 565 or NR 578 or RS 300 or RS 310 or RS 452.
Restriction: Must be a: Graduate, Professional.
Registration Information: Sections may be offered: Online.
Terms Offered: Fall, Spring.
Grade Mode: Traditional.
Special Course Fee: No.

F 625 Ecology of Forest Production Credits: 3 (3-0-0)
Also Offered As: ESS 625.
Course Description: Develops student expertise in understanding carbon and nutrient flows in forests.
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Registration Information: Must have completed one 300-level course in ECOL. Credit not allowed for both F 625 and ESS 625. Sections may be offered: Online.
Term Offered: Spring (even years).
Grade Mode: Traditional.
Special Course Fee: No.

F 693 Seminar Credit: 1 (0-0-1)
Course Description: 
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.

F 695 Independent Study Credits: Var[1-18] (0-0-0)
Course Description: 
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.

F 698 Research Credits: Var[1-18] (0-0-0)
Course Description: 
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.

F 699 Thesis Credits: Var[1-18] (0-0-0)
Course Description: 
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.

F 721 Forest Policy Credits: 3 (3-0-0)
Course Description: Policies and institutions affecting management of forest lands in U.S.
Prerequisite: NR 567.
Restriction: Must be a: Graduate, Professional.
Registration Information: Sections may be offered: Online.
Term Offered: Spring (even years).
Grade Mode: Traditional.
Special Course Fee: No.

F 798 Research Credits: Var[1-18] (0-0-0)
Course Description: 
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.
**Natural Resources (NR)**

**NR 565 Principles of Natural Resources Ecology**  
**Credits:** 3 (3-0-0)  
**Course Description:** Overview of ecological fundamentals examined from the perspective of forest, rangeland, wildlife and fisheries science and management.  
**Prerequisite:** None.  
**Registration Information:** Admission to the Master of Natural Resources Stewardship or written consent of instructor. Offered as an online course only.  
**Term Offered:** Fall.  
**Grade Mode:** Traditional.  
**Special Course Fee:** No.

**NR 566 Natural Resource Inventory and Data Analysis**  
**Credits:** 3 (3-0-0)  
**Course Description:** Sampling designs, implementation and analysis for inventory and monitoring of forests, rangelands, wetlands and streams.  
**Prerequisite:** None.  
**Registration Information:** Admission to the Master of Natural Resources Stewardship or written consent of instructor. Offered as an online course only.  
**Term Offered:** Spring.  
**Grade Mode:** Traditional.  
**Special Course Fee:** No.

**NR 568 Economics of Forests, Restoration and Fire**  
**Credits:** 3 (3-0-0)  
**Course Description:** Overview of basic microeconomics principles as applied to forestry, restoration, and wildland fire management.  
**Prerequisite:** None.  
**Registration Information:** Admission to the Master of Natural Resources Stewardship or written consent of instructor. Offered as an online course only.  
**Term Offered:** Spring.  
**Grade Mode:** Traditional.  
**Special Course Fee:** No.

**NR 578 Ecology of Disturbed Lands**  
**Credits:** 3 (3-0-0)  
**Course Description:** Analysis of basic and applied ecological principles involved in the restoration of drastically disturbed lands.  
**Prerequisite:** (LAND 220 or LIFE 220 or LIFE 320 or NR 565) and (SOCR 240).  
**Registration Information:** Sections may be offered: Online. Credit not allowed for both NR 578 and RS 578.  
**Term Offered:** Spring.  
**Grade Mode:** Traditional.  
**Special Course Fee:** No.

**Rangeland Ecosystem Science (RS)**

**RS 300 Rangeland Conservation and Stewardship**  
**Credits:** 3 (3-0-0)  
**Course Description:** Conservation and management of rangeland ecosystem values using sustainable practices.  
**Prerequisite:** BZ 120 or LIFE 102.  
**Registration Information:** Sections may be offered: Online.  
**Term Offered:** Fall.  
**Grade Mode:** Traditional.  
**Special Course Fee:** No.

**RS 310 Rangeland and Forest Ecogeography**  
**Credits:** 3 (2-2-0)  
**Also Offered As:** F 310.  
**Course Description:** Distribution of wildland plant communities and identification of important grasses, forbs, shrubs, and trees common to North America.  
**Prerequisite:** BZ 101 or BZ 104 or BZ 110 or BZ 120 or LIFE 102.  
**Registration Information:** Must have concurrent registration in RS 312. Must register for lecture and laboratory. Credit not allowed for both RS 310 and F 310.  
**Terms Offered:** Fall, Spring.  
**Grade Mode:** Traditional.  
**Special Course Fee:** No.

**RS 312 Rangeland Plant Identification Lab**  
**Credit:** 1 (0-2-0)  
**Course Description:** Identification of characteristic grasses, forbs, and shrubs common to North American rangelands.  
**Prerequisite:** RS 310, may be taken concurrently.  
**Registration Information:** Must have concurrent registration in RS 310.  
**Term Offered:** Fall.  
**Grade Mode:** Traditional.  
**Special Course Fee:** No.

**RS 319 Rangeland Assessment**  
**Credit:** 1 (0-3-0)  
**Course Description:** Five-day intensive field-based course on principles of rangeland ecosystem assessment.  
**Prerequisite:** (F 310 or RS 310) and (RS 300 and SOCR 240).  
**Term Offered:** Summer.  
**Grade Mode:** Traditional.  
**Special Course Fee:** Yes.

**RS 331 Wildland Plants and Plant Communities**  
**Credits:** 3 (2-2-0)  
**Course Description:** Distribution of non-forested wildland plant communities and important plant species in the western United States.  
**Prerequisite:** BZ 223 or NR 220.  
**Registration Information:** Must register for lecture and laboratory. Required field trips. Sections may be offered: Online.  
**Term Offered:** Fall.  
**Grade Mode:** Traditional.  
**Special Course Fee:** No.

**RS 351 Wildland Ecosystems in a Changing World**  
**Credits:** 3 (2-2-0)  
**Course Description:** Understanding and conserving non-forested wildland ecosystems, processes, and services under changing environmental conditions.  
**Prerequisite:** (LIFE 320 or LAND 220 or LIFE 220) and (SOCR 240).  
**Registration Information:** Must register for lecture and laboratory. Required field trips.  
**Term Offered:** Fall.  
**Grade Mode:** Traditional.  
**Special Course Fee:** No.
RS 400 Rangeland Improvements Credits: 2 (2-0-0)
Course Description: Improvement of rangelands through biological and cultural methods; management of improved rangelands.
Prerequisite: RS 300 or SOCR 320.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: No.
RS 420 Grass Taxonomy Credits: 3 (1-4-0)
Course Description: Anatomy, morphology, and identification of grasses.
Prerequisite: BZ 223.
Registration Information: Must register for lecture and laboratory.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.
RS 432 Rangeland Measurements and Monitoring Credits: 2 (1-3-0)
Course Description: Vegetation sampling and field measurements emphasizing applications for monitoring and adaptive management.
Prerequisite: (NR 220 and RS 300, may be taken concurrently) and (STAT 201 or STAT 301 or STAT 307).
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: Yes.
RS 452 Rangeland Herbivore Ecology and Management Credits: 3 (3-0-0)
Prerequisite: (RS 300) and (LAND 220 or LIFE 220 or LIFE 320).
Grade Mode: Traditional.
Special Course Fee: No.
RS 470 Rangeland Economics and Analysis Credits: 2 (2-0-0)
Course Description: Economics of rangeland resource use; analytical techniques for allocation of rangeland resources.
Prerequisite: (AREC 202 or ECON 202) and (RS 300).
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: No.
RS 471 Rangeland Planning and Grazing Management Credits: 2 (2-0-0)
Course Description: Definition of grazing management, grazing systems. Synthesis of animal, plant responses to grazing management. Structure, function of rangeland planning.
Prerequisite: RS 300 or SOCR 320.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: No.
RS 472 Rangeland Ecosystem Planning Credits: 4 (1-6-0)
Course Description: Range allotment, ranch, and restoration planning.
Prerequisite: RS 471.
Registration Information: Must register for lecture and laboratory. Required field trips.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.
RS 478 Ecological Restoration Credits: 3 (3-0-0)
Course Description: Analysis of environmental factors influencing restoration of disturbed lands and practices for successful restoration of disturbed ecosystems.
Prerequisite: (BZ 450 or LAND 220 or LIFE 220 or LIFE 320) and (SOCR 240).
Registration Information: Credit not allowed for both RS 478 and NR 678.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.
RS 495 Independent Study-Rangeland Ecosystems Credits: Var[1-18] (0-0-0)
Course Description:
Prerequisite: None.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.
RS 496 Group Study-Rangeland Ecosystem Credits: Var[1-18] (0-0-0)
Course Description:
Prerequisite: None.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.
RS 500 Advanced Rangeland Management Credits: 3 (3-0-0)
Course Description: Rangeland management concepts.
Prerequisite: LAND 220 or LIFE 320 or NR 220 or LIFE 220.
Registration Information: Sections may be offered: Online.
Term Offered: Fall, Spring, Summer.
Grade Mode: Traditional.
Special Course Fee: No.
RS 501 Range Habitat Manipulation Credits: 3 (3-0-0)
Course Description: Improvement of range habitats and effects on ecosystem components.
Prerequisite: RS 300 or SOCR 320.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: No.
RS 520 Range Issues and Policy Credits: 2 (2-0-0)
Course Description: Explores and evaluates current issues and policies concerning range use.
Prerequisite: RS 300 or SOCR 320.
Term Offered: Fall (even years).
Grade Mode: Traditional.
Special Course Fee: No.
RS 531 World Grassland Ecogeography Credits: 3 (2-3-0)
Course Description: Distribution, climate, and structure of the world's major grasslands with emphasis on North America.
Prerequisite: BZ 223.
Registration Information: Must register for lecture and laboratory. Required field trips. Sections may be offered: Online.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: No.
RS 532  Rangeland Ecosystem Sampling  Credits: 3 (1-3-1)
Course Description: Measurement, analysis techniques for rangeland vegetation. Applications to management emphasized.
Prerequisite: (STAT 301) and (LAND 220 or LIFE 320 or NR 220 or LIFE 220).
Registration Information: Credit not allowed for both RS 532 and RS 432.
Required field trips.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: No.

RS 552  Range Animal Production and Management  Credits: 4 (3-0-1)
Course Description: Biological and ecological basis for production of meat from rangelands.
Prerequisite: LAND 220 or LIFE 320 or NR 220 or LIFE 220.
Registration Information: Must register for lecture and recitation. Sections may be offered: Online.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Traditional.
Special Course Fee: No.

RS 565  Riparian Ecology and Management  Credits: 3 (2-2-0)
Course Description: Analysis of interactions among biotic and abiotic processes as relates to the ecology and management of riparian systems, emphasizing case studies.
Prerequisite: LAND 220 or LIFE 220 or LIFE 320.
Registration Information: Must register for lecture and laboratory. Required field trips.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.

RS 532  Rangeland Ecosystem Sampling  Credits: 3 (1-3-1)
Course Description: Measurement, analysis techniques for rangeland vegetation. Applications to management emphasized.
Prerequisite: (STAT 301) and (LAND 220 or LIFE 320 or NR 220 or LIFE 220).
Registration Information: Credit not allowed for both RS 532 and RS 432.
Required field trips.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: No.

RS 565  Riparian Ecology and Management  Credits: 3 (2-2-0)
Course Description: Analysis of interactions among biotic and abiotic processes as relates to the ecology and management of riparian systems, emphasizing case studies.
Prerequisite: LAND 220 or LIFE 220 or LIFE 320.
Registration Information: Must register for lecture and recitation. Sections may be offered: Online.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Traditional.
Special Course Fee: No.

RS 532  Rangeland Ecosystem Sampling  Credits: 3 (1-3-1)
Course Description: Measurement, analysis techniques for rangeland vegetation. Applications to management emphasized.
Prerequisite: (STAT 301) and (LAND 220 or LIFE 320 or NR 220 or LIFE 220).
Registration Information: Credit not allowed for both RS 532 and RS 432.
Required field trips.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: No.

RS 630  Ecology of Grasslands and Shrublands  Credits: 3 (3-0-0)
Course Description: Distributions and climatic controls on grassland and shrubland plant communities.
Prerequisite: NR 565.
Restriction: Must be a: Graduate, Professional.
Registration Information: Sections may be offered: Online.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.

RS 640  Vegetation-Environment Analysis  Credits: 3 (3-0-0)
Course Description: Multivariate analyses and ecological interpretations of vegetation communities.
Prerequisite: STAT 301.
Restriction: Must be a: Graduate, Professional.
Term Offered: Fall (even years).
Grade Mode: Traditional.
Special Course Fee: No.

RS 651  Primary Production and Decomposition  Credits: 4 (3-2-0)
Course Description: Energy transformations within primary producer compartment; dissipation of ecosystem biomass by decomposers, mineralization.
Prerequisite: BZ 440 and SOCR 100 to 481 - at least 1 course.
Restriction: Must be a: Graduate, Professional.
Registration Information: Must register for lecture and laboratory. Sections may be offered: Online.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: No.

RS 693  Seminar  Credit: 1 (0-0-1)
Course Description:
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Terms Offered: Fall, Spring.
Grade Mode: Instructor Option.
Special Course Fee: No.

RS 695  Independent Study-Rangeland Ecosystem  Credits: Var[1-18] (0-0-0)
Course Description:
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.

RS 696  Group Study-Rangeland Ecosystem  Credits: Var[1-18] (0-0-0)
Course Description:
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.

RS 698  Research  Credits: Var[1-18] (0-0-0)
Course Description:
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.

RS 699  Thesis  Credits: Var[1-18] (0-0-0)
Course Description:
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.

RS 793  Seminar  Credit: 1 (0-0-1)
Course Description:
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.

RS 795  Independent Study-Rangeland Ecosystem  Credits: Var[1-18] (0-0-0)
Course Description:
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.
RS 799 Dissertation Credits: Var[1-18] (0-0-0)

Course Description:
Prerequisite: None.
Restriction: Must be a Graduate, Professional.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.