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PREREQUISITES: BZ 110 and BZ 111 or BZ 120 or LIFE 103; MATH 118 or one course from MATH 141 to 161, or one course from MATH 229 or higher.

TEXT & READINGS: Benedict, A. D. 2008. The Naturalist's Guide to the Southern Rockies
Additional readings as assigned

COURSE DESCRIPTION

NR 220 is an experiential, place-based, natural resources course focused on the ecology of the Rocky Mountains. The course integrates knowledge across natural resource disciplines.

COURSE GOALS

- 1) Provide the knowledge and skills to identify and understand the key ecological and socio-cultural patterns and processes that shape the Rocky Mountain ecosystem.
- 2) Challenge students to develop an integrated view across communities and disciplines to solve contemporary, complex environmental problems.
- 3) Instill confidence, professionalism, and esprit de corps needed to lead, and work in, teams by fostering an appreciation and understanding of the different disciplines embodied by natural resource management.
- 4) Immerse students in nature and develop an appreciation of their outdoor surroundings.
- 5) NR 220 will be a prerequisite for subsequent course work at Colorado State University.

COURSE OBJECTIVES

Goal	Objectives	Assignments
1, 2, 3, 4, 5	1) Through field-based, experiential, learning opportunities in the ecological communities in and around Pingree Park students be able to:	
	a) identify the characteristics and natural history of the biophysical environment at multiple spatial and temporal scales.	<ul style="list-style-type: none"> • Wk 1 discipline specific activities (worksheets, etc.) • Quizzes (identification, key concepts) • Exam 1 • Final ID Exam • Final Written Exam
	b) demonstrate an understanding of ecological and socio-cultural relationships	<ul style="list-style-type: none"> • Community Days (integrated exercises) • Final Exam
	c) Exhibit an appreciation of ecological and socio-cultural relationships.	<ul style="list-style-type: none"> • Community Days (integrated exercises) • Final Exam
	d) demonstrate an integrated view of the natural resource disciplines.	<ul style="list-style-type: none"> • Community Days (integrated exercises) • Final Written Exam • Alpine Community Day Assignment
1, 2, 5	2) Through course exercises, students will develop, and critically evaluate, questions from natural resource disciplines by:	
	a) utilizing critical thinking skills and/or experience with the scientific method by conducting exercises that grounded in the scientific method.	<ul style="list-style-type: none"> • Discipline Day Reports • Discipline specific measurement exercises • Community Days (integrated exercises) • Exam 2 • Final Written Exam
	b) acquiring the knowledge and experience necessary to apply the appropriate sampling, data collection, and analytical techniques, as well as an appreciation of underlying assumptions, and assess a field situation to determine appropriate data sampling, collection and analysis techniques.	<ul style="list-style-type: none"> • Discipline Day Reports • Discipline specific measurement exercises • Exam 2 • Final Written Exam
	c) Evaluating and synthesizing data to prepare a cross-disciplinary report.	<ul style="list-style-type: none"> • Discipline Day Reports • Community Day Assignments (20/20, poster, 2 written reports)
1, 2, 3, 4	3) Through exposure to natural resource management issues and the methods used to solve them, students will:	
	a) demonstrate teamwork skills.	<ul style="list-style-type: none"> • Day 1 Team Building exercise • Day 5 Integrated exercise • Community Days (integrated exercises)

DISCIPLINE OBJECTIVES – Fish, Wildlife, and Conservation Biology

Bloom's Taxonomy	Objectives <i>By the end of the course, the student will be able to...</i>	Assignments
Create	<ul style="list-style-type: none"> design and carry out an independent experiment. 	Week 2: Seed predation experiment
Evaluate	<ul style="list-style-type: none"> compare population and community metrics between areas. 	Week 2: Fish shocking and stream invertebrate exercises Week 3: Pellet/bird count exercise
Analyze	<ul style="list-style-type: none"> work in teams to collect population and community data. work in teams to collected distance data and analyze distance sampling data. 	Week 2: Fish shocking and stream invertebrate exercises Week 3: Pellet/bird count exercise
Apply	<ul style="list-style-type: none"> gain experience with surveying fish, aquatic macroinvertebrates, and birds 	Week 2: Fish shocking exercise Week 2: Stream invertebrate exercise Week 3: Pellet/bird count exercise
Understand	<ul style="list-style-type: none"> learn basic concepts and definitions concerning wildlife management and conservation. 	Week 1: Intro to wildlife conservation and species ID lecture.
	<ul style="list-style-type: none"> understand conceptual issues concerning population and community parameter estimation and the scientific method. understand and utilize common abundance and species diversity estimators 	Week 2: Estimation lecture Week 2: Fish shocking, and stream invertebrate exercises Week 3: Pellet/bird count exercise
	<ul style="list-style-type: none"> learn the conceptual basis of distance sampling understand the limitations of indices. 	Week 2: Estimation lecture Week 3: Pellet/bird count exercise
Remember	<ul style="list-style-type: none"> learn to identify by sight, sound, and sign, the common species in the area through lecture and field trips. 	Week 1: Intro to wildlife conservation and species ID lecture Week 1: Morning wildlife walk

DISCIPLINE OBJECTIVES – Watershed

Bloom's Taxonomy	Objectives <i>By the end of the course, the student will be able to...</i>	Assignments
Create	<ul style="list-style-type: none"> graphs and tables of basic water quantity data measurements Write reports and present data 	Week 2: Watershed measurements Week 3: Riparian day
Evaluate	<ul style="list-style-type: none"> compare data collection methods and consider the error and uncertainty in the results. compare and contrast infiltration rates on different soil types. 	Week 2: Watershed measurements
Analyze	<ul style="list-style-type: none"> present data in different formats using tables and graphs. read an topographic map and delineate the watershed. 	Week 2: Watershed measurements
Apply	<ul style="list-style-type: none"> calculate simple stream characteristics: cross-sectional area, velocity, and discharge work in teams to collect data; organize data and write up results 	Week 2: Watershed measurements Week 3: Riparian may
Understand	<ul style="list-style-type: none"> learn the Geological Processes Creating Landforms around Pingree gain an overview of Pingree Climate and its Measurement including: <ol style="list-style-type: none"> What landforms shape the landscape around Pingree and what processes caused these? What are the key climate variables and how are they measured? What is the climate at Pingree Park, especially compared to Fort Collins and Cameron Pass (higher elevation)? 	Week 1 – Discipline Introduction/Overview
	<ul style="list-style-type: none"> Learn concepts and definitions of watersheds, geology, landforms, ecological zones 	Week 1 – Discipline Introduction/Overview
Remember	<ul style="list-style-type: none"> expose students to field measurements by learning different data collection techniques. (format) observe fluvial geomorphology and identify landforms, depositional structures, and stream energy components. 	Week 2: Watershed measurements Week 3: Riparian day

DISCIPLINE OBJECTIVES – Forestry

Bloom's Taxonomy	Objectives <i>By the end of the course, the student will be able to...</i>	Assignments
Create	<ul style="list-style-type: none"> creation of organized data tables for field collection 	Week 3/4: Lodgepole succession exercise
Evaluate	<ul style="list-style-type: none"> evaluate a burned vs. unburned forest stand compare a recently clearcut stand to a mature uncut forest stand determine volume / stocking rates for a Lodgepole Pine stand 	Week 3/4: Lodgepole community day Week 3/4: State Forest field trip Week 2 - Forest measurements day
Analyze	<ul style="list-style-type: none"> examine and measure forest succession in two distinct <i>Pinus contorta</i> stands analyze stand characteristics: growth, mortality, regeneration, volume, density 	Week 3/4: Lodgepole succession Exercise Week 2 - Forest measurements day
Apply	<ul style="list-style-type: none"> gain experience conducting a forest inventory: sampling, tree measurements apply forestry techniques to evaluate forest density in community exercises develop ability to identify plants in the field 	Week 2 - Forest measurements day Week 3/4: Lodgepole and Ponderosa Pine community days Weeks 1-4
Understand	<ul style="list-style-type: none"> understand volume, density, growth percent calculations understand Successional patterns in forest ecosystems understand impact of disturbance on forest density 	Week 2 - Forest measurements day Week 3/4: Lodgepole and Ponderosa Pine community days
Remember	<ul style="list-style-type: none"> tree and shrub identification habitat and elevational associations natural history of plants 	Week 1 Weeks 1 - 4 Weeks 1 - 4

DISCIPLINE OBJECTIVES – Range

Bloom's Taxonomy	Objectives <i>By the end of the course, the student will be able to...</i>	Assignments
Create		
Evaluate	<ul style="list-style-type: none"> • in the field, measure forage production and then determine stocking rate. • compare methods and measures of plant abundance • compare current year data (spp. comp, condition) and information (apparent trend) to previous years • compare apparent trend to actual (measured) trend in range condition • compare the capability and potential of two different riparian settings 	Week 3: Production and stocking rate Week 2: Range condition and trend (RCT) Week 2: RCT Weeks 2+3: RCT and Riparian Proper Functioning Condition (PFC) Week 3: Riparian PFC
Analyze	<ul style="list-style-type: none"> • analyze plant abundance and plant community composition data (cover and frequency) • analyze aboveground herbaceous plant production data as affected by distance from stream • 	Week 2: RCT Week 3: Production and stocking rate
Apply	<ul style="list-style-type: none"> • in the field, measure aspects of a range community and determine the Rangeland Condition of that plant community. • gain field experience quantifying plant abundance and species composition based on canopy cover and frequency • gain experience in field identification of grasses and forbs by sight • gain experience assessing apparent rangeland trend • gain experience determining riparian Proper Functioning Condition 	Week 2: Week 2: RCT Weeks 1 - 4 Week 2: RCT Week 3: Riparian discipline day
Understand	<ul style="list-style-type: none"> • understand aspects of the ecology and physiology of grasses and forbs in the Southern Rocky Mountain Ecoregion. 	Week 1
	<ul style="list-style-type: none"> • understand what is meant by the terms plant succession, potential natural community, and rangeland condition. • understand what is meant by Apparent Range Condition Trend. 	Week 2: RCT

	<ul style="list-style-type: none"> • understand what is meant by the term Stocking Rate. • understand how stocking rate is obtained and calculated for a variety of wild and domestic herbivores. • develop observational skills in identifying key characteristics of the riparian zones (format) • identify key indicators of stream health. • understand the conceptual basis for plant classification as related to plant identification • understand the conceptual basis for determination of range condition and trend in range condition • understand common measures of plant abundance and methods for obtaining them 	<p>Week 3: Riparian Discipline Day lect. and lab Week 3: Riparian Discipline Day lect. and lab Week 3: Riparian Discipline Day lab Week 3: Riparian Discipline Day lecture Week 2: RCT lecture and lab Week 2: RCT lecture and lab Week 2: RCT lecture and lab</p>
Remember	<ul style="list-style-type: none"> • identify a selection of grasses and forbs across different ecosystems in the Southern Rocky Mountain Ecoregion. • be familiar with the plant morphology of grasses and forbs to facilitate identification. (format) 	<p>Week 1: (quizzes weeks 1-4) Week 1: lecture and lab</p>
	<ul style="list-style-type: none"> • exposure to one approach to stream classification and one approach to condition assessment (Riparian days) (format) 	<p>Week 3: lecture and lab</p>

DISCIPLINE OBJECTIVES – Human Dimensions

Bloom's Taxonomy	Objectives <i>By the end of the course, the student will be able to...</i>	Assignments
Create	<ul style="list-style-type: none"> zone a topographical map according to the Recreational Opportunity Spectrum. 	Week 3: Map zoning exercise
Evaluate	<ul style="list-style-type: none"> discuss mitigation techniques for impacted trails and campsites based on measurements conducted on site. discuss ethics as applies to impacts in outdoor recreational settings. 	Week 2: Trail uses & opportunities assignment
Analyze	<ul style="list-style-type: none"> differentiate between different geographic coordinate systems including latitude and longitude, township and range, and Universal Transverse Mercator. 	Week 1: In-class map exercise
	<ul style="list-style-type: none"> measure the impacts to both trails and campsites in front country and wilderness areas using USDA Forest service and National Park assessment forms. differentiate between dispersed and concentrated outdoor use and identify the proper situation in which to employ either technique. 	Week 2: Multiple parameter campsite inventory Front country/backcountry campsite assessment Rapid trail census activity
	<ul style="list-style-type: none"> identify different recreational experience preferences using REP scales. differentiate between different ROS zones and the types of recreational experiences they provide 	Week 3: In-class REP assessment
Apply	<ul style="list-style-type: none"> account for declination while using a map and compass. navigate an orienteering course using a topographic map, compass, and GPS unit. 	Week 1: Map, GPS, & compass course
	<ul style="list-style-type: none"> recognize impacts to the environment in the field of outdoor recreation. employ Leave No Trace mitigation techniques while hiking. 	Week 2: In-class LNT activities
Understand	<ul style="list-style-type: none"> identify symbols on a topographic map. identify their location using both a compass and map as well as using a GPS unit. calculate their distance traveled while hiking using paces. convert distances on a map to actual distances. 	Week 1: In-class map exercises In-class kinesthetic orientation activities Map, GPS, & compass course Map & compass HW assignment
	<ul style="list-style-type: none"> discuss differences in recreational experience preferences and resulting ROS zones. 	Week 3: In-class REP assessment

Remember	<ul style="list-style-type: none">• discuss different forms and uses of interpretation in the outdoors• identify emotional and intellectual connections made by various interpretive signs in the Pingree Park area.	Week 3: Interpretive sign scavenger hunt assignment
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DISCIPLINE OBJECTIVES – Community Days

Bloom's Taxonomy	Objectives <i>By the end of the course, the student will be able to...</i>	Assignments
Create	<ul style="list-style-type: none"> • develop goals, management prescriptions, and monitoring plans (Ponderosa Pine Community) 	Week 4: Wildlife Management Plan
	<ul style="list-style-type: none"> • apply all their learning skills (examples?) in an integrated exercise and present findings in a concise poster format. (Spruce Fir) • take initiative and control the choices for appropriate data analysis (examples?). (Spruce Fir) 	Week 4: Spruce Fir Poster
	<ul style="list-style-type: none"> • create an artistic creation reflecting their experiences at Pingree Park 	Week 4: Alpine Day art assignment
Evaluate	<ul style="list-style-type: none"> • evaluate among competing alternatives, the highest and best use of a piece of public land. (Mountain shrub community) • assess recreational impacts as well as the impacts of grazing and non-use. (Mountain shrub community) • use a variety of methods to assess recreational, ecological, and agricultural land uses • analyze and present their data in a mock town hall meeting. (Mountain shrub community) • analyze and present their data in a technical report format. (Mountain shrub community) • assess viability of project design for site location 	Week 4: Mountain Shrub Technical Report and power point presentation Week 4: Spruce Fir Poster
	<ul style="list-style-type: none"> • perform environmental assessment of the biological, social, and physical landscapes. (Spruce Fir) 	Week 4: Spruce Fir Poster
Analyze	<ul style="list-style-type: none"> • examine and compare a recently burned lodgepole pine stand with a more mature lodgepole stand with respect to composition, diversity, and regeneration. (Lodgepole community) • collect data for environmental assessment of site characteristics for development 	Week 4: Lodgepole Report Week 4: Spruce Fir Poster
Apply	<ul style="list-style-type: none"> • gain experience working in unfamiliar groups (format) • build esprit-de-corps/ building communities across disciplines 	Week 1: Teambuilding/welcome exercise Week 1: Friday afternoon exercise
	<ul style="list-style-type: none"> • work as a team to solve problems based on material from the first week. • apply all learning objectives in holistic assignment using environmental assessment 	Week 1: Friday afternoon exercise Week 4: Spruce Fir Poster
	<ul style="list-style-type: none"> • develop a wildlife management plan for a hunted species, indicator species, and species of concern in the Ponderosa Pine ecological community. (Ponderosa Pine Community) • gain experience in photo interpretation, topo map reading, forestry measurements. (Ponderosa Pine Community) 	Week 4: Wildlife Management Plan

	<ul style="list-style-type: none"> • apply Leave No Trace principles in a Wilderness Zone 	Week 4: Alpine Day hike
Understand	<ul style="list-style-type: none"> • understand the importance of a wildlife management plan (Ponderosa Pine Community) 	Week 4: Wildlife Management Plan
	<ul style="list-style-type: none"> • recognize the differences in rules and regulations in Wilderness Zones compared to other ROS zones • understand history of art and its influence in the formation of the National Parks System 	Week 4: Alpine Day film and discussion
	<ul style="list-style-type: none"> • understand the importance of recognizing the limitations of methods and techniques to practice using best judgment. 	Week 4: Spruce Fir Poster
Remember		

SCHEDULE

Week 1

Time	Sun	Monday			Tuesday			Wednesday			Thursday			Friday			Sat
		ALL			Gr 1	Gr 2	Gr 3	Gr 1	Gr 2	Gr 3	Gr 1	Gr 2	Gr 3	Gr 1	Gr 2	Gr 3	
5:30							Wildlife	Wildlife							Wildlife		
6:30-7:15		Vans leave CSU (7am)			Breakfast 7:30 Morning Mass												
8-Noon		Arrive Mountain Campus/ Check In			Forestry	Range	Wildlife	Wildlife	Forestry	Range	Range	Watershed	Forestry	Watershed	Wildlife	HD	
12-1		Lunch															
1-5:30		1-4 Team-building/ropes 4:30 Campus orientation			Forestry	Range	Watershed	HD	Forestry	Range	Range	HD	Forestry	Group Challenge			
5:30-6:15		Dinner															
7-9		Intro/academic orientation Spatial Lecture															

Week 2

Time	Sun	Monday			Tuesday			Wednesday			Thursday			Friday			Sat
		Gr 1	Gr 2	Gr 3	Gr 1	Gr 2	Gr 3	Gr 1	Gr 2	Gr 3	Gr 1	Gr 2	Gr 3	Gr 1	Gr 2	Gr 3	
6:30-7:15		Breakfast 7:30 Morning Mass															
8-Noon	Wildlife CSI	HD	Wildlife	Forestry	Wildlife	HD	Watershed	Watershed	Range	HD	Forestry	Watershed	Range	Range	Forestry	Wildlife	
12-1		Lunch															
1-5:30		HD	Wildlife	Forestry	Wildlife	HD	Watershed	Watershed	Range	HD	Forestry	Watershed	Range	Range	Forestry	Wildlife	
5:30-6:15		Dinner															
7-9	Exam 1	Return Exam															

Week 3

Time	Sun	Monday – Discipline Day			Tuesday – Community Day		Wednesday – Community Day		Thursday – Discipline Day			Friday – Community Day		Sat
		Gr 1	Gr 2	Gr 3	Gr 1	Gr 2	Gr 1	Gr 2	Gr 1	Gr 2	Gr 3	Gr 1	Gr 2	
6:30-7:15		Breakfast 7:30 Morning Mass (Thurs- Lodgepole community report due)												
8-Noon		Forestry	Wildlife	Wtrshd/Range	Mountain Shrub	Lodgepole	Lodgepole	Mountain Shrub	Wtrshd/Range	Forestry	Wildlife	Ponderosa Pine	Spruce Fir	Bomber Hike
12-1		Lunch												
1-5:30		Forestry	HD	Wtrshd/Range	Mountain Shrub	Lodgepole	Lodgepole	Mountain Shrub	Wtrshd/Range	Forestry	HD	Ponderosa Pine	Spruce Fir	
5:30-6:15		Dinner												
7-9	Exam 2	Return Exam							Gr 1 Town Hall – Mountain Shrub	Gr 2 Town Hall - Mountain Shrub				

Week 4

Time	Sun	Monday – Community Day		Tuesday – Discipline Day			Wednesday – Community Day		Thursday	Friday
		Gr 1	Gr 2	Gr 1	Gr 2	Gr 3	ALL	ALL	ALL	
6:30-7:15		Breakfast 7:30 Morning Mass (Mon & Tues- Community reports due)								
8-Noon		Spruce Fir	Ponderosa Pine	Wildlife	Wtrshd/Range	Forestry	Alpine	Final ID exam	Final written exam	
12-1		Lunch							Student check-out by noon	
1-5:30		Spruce Fir	Ponderosa Pine	HD	Wtrshd/Range	Forestry	Alpine	Study		
5:30-6:15		Dinner								
7-9	Boat race			Ken Burns movie night			Talent Show Photo contest winners	Final exam review High ropes course		

EXPECTATIONS:

You must attend all required field trips and classes. There will seldom be make-up field trips or exercises. Rare exceptions are for emergencies or conditions beyond your control. In that case, I must be notified prior to the trip/exercise, unless that is truly impossible.

Assignments will generally involve collecting data, calculations, and presentations/reports/essays. Some assignments will be individual; others will be group-based. Late work will only be accepted within 24 hours from the due date and will be penalized 20%.

Expect quizzes to cover lecture, field trip, or reading material. I expect you to be prepared, to interact in discussions, and to ask questions.

Aspects of the syllabus and schedule may change as the course proceeds. Any change will be announced in class. Each day the schedule will be discussed and group assignments will be made.

ACADEMIC INTEGRITY AND STUDENT CONDUCT

This course will adhere to the CSU Academic Integrity Policy as found on the Student' Responsibilities page of the CSU General Catalog and in the Student Conduct Code. At a minimum, violations will result in a grading penalty in this course and possibly a report to the Office of Conflict Resolution and Student Conduct Services.

Student Conduct: "Colorado State University expects students to maintain standards of personal integrity that are in harmony with the educational goals of the institution; to observe national, state, and local laws, and University regulations; and to respect the rights, privileges, and property of other people" (Student Rights and Responsibilities). "...The University recognizes the right of all students to engage in discussion, to exchange thought and opinion, and to speak, write, or print freely on any subject in accordance with the guarantees of Federal or State constitutions".

Classroom behavior and discourse should reflect the values of respect and civility. Classroom disruption by students constitutes a serious breach of University behavioral expectations. Faculty members are encouraged to respond to behaviors that are disruptive to the academic environment, and they may require students to leave the class pending discussion and resolution of the concerns. Students may be referred to the Office of Judicial Affairs for possible university disciplinary action including suspension, dismissal or expulsion and/or the campus police summoned in serious cases of disruptive behavior.

POINT ALLOCATION AND GRADE BREAKDOWN

(subject to change)

	Percentage Value	Point Value (based on 2000 pts total)
<u>Week 1</u>		
Watershed Exercise	1%	20
Map, Compass, Pacing, GPS exercise	1%	20
Group Challenge and Leadership Ex.	1%	20
<u>Week 2</u>		
Exam 1	10%	200
Measurement Exercises (e.g., 5 @ 40 pts each)	10%	200
<u>Week 2, 3, & 4</u>		
Identification Quizzes	7%	140
Environmental Comm Assignment	1%	20
<u>Weeks 3 & 4</u>		
Exam 2	10%	200
Community Day Papers (varying point see below)	20%	400
Discipline Day (e.g., 4@ 60 pts each)	12%	240
Final ID Exam	12%	240
Final Written Exam	15%	300
Total	100%	2000

Community Days Papers	
Community	Points
Mountain Shrub	90
Ponderosa Pine	90
Lodgepole Pine	90
Spruce-Fir	90
Alpine	40
Total	400

Grade Breakdown
A = 90% - 100% (1,800 – 2,000 points)
B = 80% - 89.9% (1,600 – 1,799 points)
C = 70% - 79.9% (1,400 - 1,599 points)
D = 60% - 69.9% (1,200 – 1,399 points)
F < 60% (< 1,200 points)