

## Bachelor of Science in Natural Resources: Global Change Ecology & Management

		FALL		SPRING			
		Course Title	Units	Prerequisite?	Course Title	Units	Prerequisite?
<b>Freshman</b>		CHEM 151 OR CHEM 141 and 143	4	MATH 112 or placement	CHEM 152 OR CHEM 142 and 144	4	1st semester CHEM
		ENGL 101 or 109H	3		ENGL 102 (or 109H)	3	
		RNR 101: Global Sustainability and Natural Resources	3		ECOL 182R and L General Biology Lecture and Lab	4	
		Calculus: MATH 113, 122B, or 125	3	MATH 112 or placement test	Tier 1 Traditions and Cultures	3	
		Tier 1 Individuals and Societies	3		Tier 1 Individuals and Societies	3	
		TOTAL	16		TOTAL	17	
<b>Sophomore</b>		ECON 200	3		Tier 2 Individuals and Societies	3	
		Statistics: MATH 163 or 263, or PSY 230, or SBS 200	3	MATH 112 or placement	Tier 2 Arts or Humanities Elect.	3	
		<b>RNR 200 Conservation of Natural Environments</b>	3		Tier 1 Traditions and Cultures	3	
		Phys 102	3	MATH 112 or placement/none	<b>RNR 384 Natural Resources Management Practices</b>	3	
		MCB 181L General Biology Lab	1	MATH 112 or placement; CHEM	Technical Elective	3	
		MCB 181R General Biology Lecture	3	MATH 112 or placement; CHEM	TOTAL	15	
	TOTAL	16					
<b>Junior</b>		<b>RNR 316 Natural Resources Ecology</b>	3	ECOL 182R, ECOL 182L, RNR 230R/L	Human Systems Elective: see list	3	
		Technical Writing: ENGL 308, 313, 340, 414 or ENVS 408, 415	3		Oral or Media Communication: ALC 422, COMM 113, COMM 119, JOUR 455, JOUR 472, SBE 202, SCI 401, RNR 495A	3	
		<b>RNR 230R and 230L Field Botany</b>	3		<b>RNR 321 Ecological Surveys and Sampling</b>	3	statistics
		Policy, Law, and Economics Elective: AREC 360 , 476 or 479; RNR 485	3	ECON 200/MATH 112	Managment Elective: see list	3	
		Earth Systems and Global Change Elective	3		Technical Skills: RNR 403, 417, 429 or GEOG 330 or RAM 446 or 456A	3	
		TOTAL	15		TOTAL	15	
<b>Senior</b>		RNR 440 Climate Change Adaptation	3	<b>Seniors only</b>	RNR 496G - Climate Assessment	3	
		Environment Elective: RNR 452 Dryland Ecohydrology (Fall) or RNR 458 Ecosystem Ecology (Spring)	4	One year of general biology	Biological Systems Elective: see list	3	
		GEOS 478 Global Change	3	junior/senior; intro bio/chem/phys	GEOG 430 The Climate System	3	
		Technical electives	5		<b>RNR 480 Natural Resources Policy and Law</b>	3	RNR 200
		SNRE Requirement	1		Technical electives	3	
		TOTAL	16		TOTAL	15	

Diversity Emphasis: One general education course must have the non-Western Civilization, Gender, Race, Class, Ethnicity designation  
 2nd semester language proficiency required-- not included in this plan

**GLOBAL CHANGE ECOLOGY & MANAGEMENT OPTION**  
**Major: Natural Resources**  
**Technical Electives**

GCEM students take a minimum of one class in each of five areas: skills and tools, Earth systems and global change, biological systems, human systems, and management.

**Earth Systems and Global Change**

ATMO 171 Intro to Meteorology and Climatology  
ATMO 336 Weather climate and society  
ATMO 421C Physical climatology: mechanisms of change  
ATMO 436A Fundamentals of atmospheric sciences  
GEOG 304 Water environment and society  
GEOG 431 Global and regional climatology  
GEOS 212 Intro to oceanography  
GEOS 220 Environmental History of the Southwest  
GEOS 308 Paleontology  
GEOS 412A Ocean sciences  
GEOS 482 Paleoclimatology  
RNR 355 Wildland Fire  
RNR 429 Ecological Climatology  
ENVS 200/201 Soils w/ lab  
ENVS 461 Soil & water conservation  
WSM 468 Wildland water quality

**Biological systems**

ECOL 320 Genetics  
ECOL 335 Evolutionary biology  
ECOL 406R Conservation biology  
ECOL 426 Population genetics  
ECOL 496J Plant population ecology  
ECOL 496R Species diversity  
ENVS 300 Soil Ecology and Sustainable Systems  
GEOG 438 Biogeography  
RAM 382 Rangeland plant communities  
PL S 240 Plant biology

PL S 360 Principles of plant physiology  
PL S 440 Plant growth & development  
WFSC 471 Stream ecology

**Human Systems**

AREC 217 Resource and Environmental economics  
AREC 476 Envl law and economics  
GEOG 305 Economic geography  
GEOG 371 Principles and practices of regional development  
GEOG 379 Urban growth and development  
GEOG 380 Global agricultural and international relations  
GEOG 404 Politics of nature  
ENVS 310 Ecosystem Health and Justice  
HWR 415 Intro to water resources policy  
PA 461 Global climate change science and policy  
RNR 256 Sustainable cities and societies  
RNR 476 Envl law and economics  
RNR 481 Environmental policy  
RNR 495F Conservation biology in developing countries  
WSM 444 Applied environmental law

**Management**

AREC 350 Economics, ethics and environmental management  
GEOG 301 Intro to regional planning  
GEOG 379 Urban Growth and Development  
GEOG 408 Arizona and the Southwest  
RAM 436A Grazing ecology and management  
RAM 446 Management and Restoration of Wildland Vegetation  
RNR 496E Restoration ecology  
ENVS 401 Sustainable management of arid lands  
ENVS 454 Water harvesting

WS M 438 Fire Ecology  
WS M 462 Watershed management  
WFSC 444 Wildlife Management  
WFSC 455R Fishery Management

**Additional Electives**

ECOL 380 Math models in biology  
GEOG 457 Statistical techniques in geography and regional development  
GEOS 497C Introduction to dendrochronology  
RNR 322 Field Methods in Nat Res  
RNR 419 Cartographic modeling  
RNR 473 Spatial analysis  
RNR 483 Geography applications of remote sensing  
RNR 490 Remote sensing for the study of planet earth  
WS M 497C/I Dendrochronology and dendroclimatology  
RNR 492 Directed Research  
RNR 493 Internship  
RNR 499 Independent Study

**Consider an Undergraduate Certificate in:**

- Rangeland Management
- Geographic Information Systems
- Zoo and Aquarium Conservation
- International Environmental Conservation