

# PH.D. IN WATERSHED SCIENCE

Sustainable management of freshwater resources is an increasingly important and complex challenge in Colorado and worldwide, and we need scientists who can address complex water issues. The watershed science program focuses on how water moves through the landscape, what factors affect its quality, and how to manage water resources. Students in the Ph.D. in Watershed Science program work closely with research scientists in the classroom, laboratory, and field on both basic and applied watershed science research. Students are exposed to cutting-edge field, data analysis, and modeling techniques through flexible programs of study and access to a breadth of water-related courses throughout the university. Students also have opportunities to participate in seminars and field courses.

The Ph.D. in Watershed Science requires 72 credits, most of which are research credits. Coursework includes in-depth classes in the student's area of research, as well as classes that expand into other disciplines. Each student develops an individualized program of study with the guidance and approval of the student's graduate committee. Students in the Ph.D. program develop new contributions to the literature of the watershed science discipline.

## Requirements Effective Fall 2021

Code	Title	Credits
<b>Required Foundation Courses</b>		
GRAD 544	Ethical Conduct of Research	1
WR 692	Seminar	1
<b>Discussion Courses</b>		
Select at least 3 credits from the following:		3
WR 574	Advanced Snow Hydrology	
WR 616	Hillslope Hydrology and Runoff Processes	
<b>Quantitative Courses</b>		
Select at least 3 credits from the following:		3
NR 512	Spatial Statistical Modeling-Natural Resources	
NR 523/STAT 523	Quantitative Spatial Analysis	
STAR 511	Design and Data Analysis for Researchers I	
STAR 512	Design and Data Analysis for Researchers II	
WR 674	Data Issues in Hydrology	
<b>Skill Courses</b>		
Select at least 3 credits from the following:		3
GEOL 551	Groundwater Modeling	
NR 503/GR 503	Remote Sensing and Image Analysis	
NR 505	Concepts in GIS	
WR 417	Watershed Measurements	
WR 419	Water Quality Analyses	
WR 524/CIVE 524	Modeling Watershed Hydrology	
WR 575	Snow Hydrology Field Methods	
<b>Depth and Breadth Courses</b>		
Select at least 6 credits from the following:		6

AREC 542	Applied Advanced Water Resource Economics	
CIVE 413	Environmental River Mechanics	
CIVE 520	Physical Hydrology	
CIVE 544	Water Resources Planning and Management	
CIVE 613	River Restoration Design	
CIVE 622	Risk Analysis of Water/Environmental Systems	
CIVE 625	Quantitative Eco-Hydrology	
CIVE 626	Integrated Analysis of Coupled Water Issues	
ESS 501	Principles of Ecosystem Sustainability	
ESS 543/ATS 543	Global Climate Change	
ESS 660	Biogeochemical Cycling in Ecosystems	
GEOL 452	Hydrogeology	
GEOL 552	Advanced Topics in Hydrogeology	
GEOL 652	Fluvial Geomorphology	
NR 510	Ecosystem Services--Theory and Practice	
NR 577	Wetland Ecology and Restoration	
SOC 461	Water and Social Justice	
SOC 664	Sociology of Water Resources	
SOCR 522	Micrometeorology	
SOCR 540	Soil-Plant-Nutrient Relationships	
SOCR 670	Terrestrial Ecosystems Isotope Ecology	
WR 416	Land Use Hydrology	
WR 418	Land Use and Water Quality	
WR 510	Watershed Management in Developing Countries	
WR 511	Water Resource Development	
WR 512	Water Law for Non-Lawyers	
<b>Research and Dissertation</b>		
WR 798	Research	2
WR 799	Dissertation	2
<b>Additional Credits (A maximum of 30 credits may be accepted from a master's degree toward the Ph.D.)</b>		<b>51</b>
<b>Program Total Credits:</b>		<b>72</b>

A minimum of 72 credits are required to complete this program.