



SUSTAINABLE WATER INTERDISCIPLINARY MINOR



CSU
WATER
CENTER

in partnership with



SCHOOL OF GLOBAL
ENVIRONMENTAL
SUSTAINABILITY
Colorado State University

Water is critical to our economic, societal, and environmental well-being. This is particularly so in the western United States where a rich and evolving water management history continues to unfold. Western water management is complex and affects individual lives and communities in diverse ways.

In semi-arid Colorado, water is available all year only if it is “controlled” in some manner by humans. Such control also influences the amount and timing of water available for maintaining ecosystem health. Colorado balances the competing needs for water using a water management system that includes such concepts as: appropriation doctrine, water allocation, water rights, beneficial use of water, and minimum stream flows. Many organizations are involved in managing Colorado’s water including the State Engineer’s Office, Colorado Water Conservation Board, conservancy/conservation districts, water utilities, ditch companies, and federal agencies.

If there is magic on this planet, it is contained in water

~ Loren Eisley

Water management in the American West is not guided by any one discipline, but rather utilizes knowledge from many disciplines. New uses of water — for meeting ecological and recreational needs, for example — are competing with more established uses, such as municipal and agricultural, in ways that demand skills not previously required of water managers.

Today’s water professional needs a grasp of the history of water management, the legal and administrative structure established to allocate and control the distribution of water, the economics of water development and protection, the relationship of water to ecological conditions, and land-use impacts on water quality and water use. Students planning careers in water resources need to have an area of specialization (a university major) as well as a head start in understanding these complex aspects of modern western water management.

Colorado State University is recognized as one of the world’s leading institutions of higher education for water professionals, with over 200 faculty and staff who apply their disciplines to water and who offer more than 150 water-oriented courses each year. The majors offered at Colorado State University, from fishery and wildlife biology to civil engineering to sociology, provide students the disciplined rigor needed to be successful.

The purpose of Colorado State University’s Sustainable Water Interdisciplinary Minor (SWIM) is to offer undergraduate students, regardless of their major, an opportunity to gain a deeper knowledge of the many dimensions of water management. By taking advantage of the outstanding water expertise available at CSU, students can better prepare themselves for careers in water management or graduate study in a water-related area.

SWIM students will complete 21 credits in core and elective courses that are particularly relevant to today’s water manager. Completion of the program is certified on the student’s academic record. For more information visit www.watercenter.colostate.edu

Colorado State University



SUSTAINABLE WATER INTERDISCIPLINARY MINOR (SWIM) CHECKSHEET

The Sustainable Water Interdisciplinary Minor (SWIM) offers undergraduate students, regardless of their major, an opportunity to gain a deeper knowledge of the many dimensions of water management. SWIM students will complete 21 credits in core and elective courses that are particularly relevant to today's water manager. Completion of the program is certified on the student's academic record.

REQUIRED CORE

Course Code	Course Name	Offered	Credits	Prerequisites
<input type="checkbox"/> AREC/ECON 240	Issues in Environmental Economics	F,S	3	
<input type="checkbox"/> AREC 342	Water Law, Policy, and Institutions	S	3	
<input type="checkbox"/> GR/WR 304	Sustainable Watersheds	F,S	3	Completion of the AUCC 1B Mathematics requirement

FOUNDATIONS OF WATER SELECT A MINIMUM OF 6 CREDITS FROM THE FOLLOWING COURSE GROUPS WITH NO MORE THAN ONE COURSE PER GROUP

BIOLOGY

Course Code	Course Name	Offered	Credits	Prerequisites
<input type="checkbox"/> BZ 104	Basic Concepts of Plant Life	F,S	3	
<input type="checkbox"/> BZ 110	Principles of Animal Biology	F,S,SS	3	
<input type="checkbox"/> BZ 120	Principles of Plant Biology	F,S	4	
<input type="checkbox"/> FW 204	Introduction to Fishery Biology	F	3	
<input type="checkbox"/> LIFE 103	Biology of Organisms - Animals and Plants	F,S,SS	4	LIFE 102

CHEMISTRY

<input type="checkbox"/> CHEM 103	Chemistry in Context	F,S,SS	3	
<input type="checkbox"/> CHEM 107	Fundamentals of Chemistry	F,S,SS	4	MATH 117 or placement out of MATH 117 or MATH 141 or MATH 155 or MATH 160 or MATH 161 or MATH 229 or MATH 261 or concurrent registration in any of the above
<input type="checkbox"/> CHEM 113	General Chemistry II	F,S,SS	3	CHEM 107 or CHEM 111 or CHEM 117; MATH 124 or placement out of MATH 124 or MATH 141 or MATH 155 or MATH 160 or MATH 161 or MATH 229 or MATH 261 or concurrent registration in any of the above

GEOGRAPHY

<input type="checkbox"/> GR 100	Introduction to Geography	F,S	3	
<input type="checkbox"/> GR/ESS 210	Physical Geography	F	3	

ECOLOGY

<input type="checkbox"/> ESS 211	Foundations in Ecosystem Science	S	3	GR/ESS 210
<input type="checkbox"/> ESS 311	Ecosystem Ecology	F	3	ESS 211
<input type="checkbox"/> LAND/LIFE 220	Fundamentals of Ecology	F	3	Three credits of 100-level biology or HORT 100; Three credits of 100-level mathematics
<input type="checkbox"/> LIFE 320	Ecology	F,S	3	BZ 101 or BZ 104 or BZ 110 or BZ 120 or LIFE 102; MATH 141 or MATH 155 or MATH 160

FOUNDATIONS OF WATER, CONT. SELECT A MINIMUM OF 6 CREDITS FROM THE FOLLOWING COURSE GROUPS WITH NO MORE THAN ONE COURSE PER GROUP

GEOLOGY

Course Code	Course Name	Offered	Credits	Prerequisites
<input type="checkbox"/> GEOL 120	Exploring Earth: Physical Geology	F,S,SS	3	
<input type="checkbox"/> GEOL 122	The Blue Planet: Geology of our Environment	F,S,SS	3	
<input type="checkbox"/> GEOL 124	Geology of Natural Resources	S	3	
<input type="checkbox"/> GEOL 150	Physical Geology for Scientists and Engineers	F	4	

PHYSICS

<input type="checkbox"/> PH 110	Descriptive Physics	F,S	3	
<input type="checkbox"/> PH 121	General Physics	F,S,SS	5	MATH 125 or concurrent registration or MATH 155 or concurrent registration or MATH 157 or concurrent registration or MATH 160 or concurrent registration
<input type="checkbox"/> PH 141	Physics for Scientists and Engineers	F,S,SS	5	MATH 126 or concurrent registration; MATH 155 or concurrent registration or MATH 159 or concurrent registration or MATH 160 or concurrent registration

CONTEXT OF WATER SELECT A MINIMUM OF 6 CREDITS FROM THE FOLLOWING COURSES WITH NO MORE THAN FOUR CREDITS PER SUBJECT CODE ¹

SOCIOLOGICAL-ECONOMIC CONTEXT

Course Code	Course Name	Offered	Credits	Prerequisites
<input type="checkbox"/> GES 101	Foundations of Environmental Sustainability	F	3	
<input type="checkbox"/> AGRI/IE 270	World Interdependence - Population and Food	S	3	
<input type="checkbox"/> AREC 341	Environmental Economics	F	3	AREC 202 or ECON 202; AREC 240 or ECON 240
<input type="checkbox"/> CON 476 ²	Sustainable Practices - Design and Construction	F	3	
<input type="checkbox"/> E 339	Literature of the Earth	F,S	3	CO 150
<input type="checkbox"/> JTC 461	Writing about Science, Health, and Environment	F	3	JTC 210 or JTC 300 or LB 300
<input type="checkbox"/> NR 320	Natural Resource History and Policy	F,S	3	
<input type="checkbox"/> PHIL 320	Ethics of Sustainability	F,S	3	
<input type="checkbox"/> PHIL 345	Environmental Ethics	F,S	3	
<input type="checkbox"/> POLS 361	U.S. Environmental Politics and Policy	F,S,SS	3	POLS 101
<input type="checkbox"/> SOC 323	Sociology of Environmental Governance	S	3	SOC 100 or SOC 105; minimum of 30 credits
<input type="checkbox"/> SOC 461	Water, Society, and Environment	F,S,SS	3	SOC 100 or SOC 105

ECOLOGICAL-BIOLOGICAL CONTEXT

<input type="checkbox"/> BZ 321	Aquatic Vascular Plants	F	3	BZ 223 or BZ 325
<input type="checkbox"/> BZ 415	Marine Biology	S	4	BC 351 or BC 401; BZ 214
<input type="checkbox"/> BZ 471	Stream Biology and Ecology	F	3	LAND 220/LIFE 220 or LIFE 320
<input type="checkbox"/> BZ 474	Limnology	F	3	LAND 220/LIFE 220 or LAND 320
<input type="checkbox"/> ERHS 320	Environmental Health - Water and Food Safety	F	3	MIP 300 or concurrent registration
<input type="checkbox"/> FW 300	Biology and Diversity of Fishes	S	2	BZ 111 or LIFE 103
<input type="checkbox"/> FW 400	Conservation of Fish in Aquatic Ecosystems	F	3	FW 300; LIFE 320
<input type="checkbox"/> LAND/HORT 368	Landscape Irrigation and Water Conservation	F,S	3	HORT 100 or LAND 110

CONTEXT OF WATER, CONT. SELECT A MINIMUM OF 6 CREDITS FROM THE FOLLOWING COURSES WITH NO MORE THAN FOUR CREDITS PER SUBJECT CODE ¹

PHYSICAL CONTEXT

Course Code	Course Name	Offered	Credits	Prerequisites
<input type="checkbox"/> ATS 150	Science of Global Climate Change	S	3	
<input type="checkbox"/> CIVE 322	Basic Hydrology	F,S	3	CBE 331 or CIVE 300 or WR 416; CIVE 202 or STAT 301 or STAT 315
<input type="checkbox"/> CIVE 330	Ecological Engineering	S	3	BZ 110; BZ 111 or BZ 120 or LIFE 102 or SOCR 240; CHEM 113; CIVE 300 or LIFE 320
<input type="checkbox"/> CIVE 413	Environmental River Mechanics	F	3	CIVE 300 or WR 416
<input type="checkbox"/> CIVE 423	Groundwater Engineering	S	3	CBE 331 or CIVE 300 or WR 416
<input type="checkbox"/> CIVE 440	Nonpoint Source Pollution	F	3	CIVE 300 or CIVE 322 or SOCR 240 or WR 416
<input type="checkbox"/> GEOL 452	Hydrogeology	F	4	GEOL 120 or GEOL 122 or GEOL 124 or GEOL 150 or GR 210; MATH 161 or MATH 255; PH 141
<input type="checkbox"/> SOCR 370	Irrigation Principles	S	2	HORT 100 or SOCR 100; BZ 120 or SOCR 240
<input type="checkbox"/> SOCR 371	Irrigation of Field Crops	F	1	SOCR 370
<input type="checkbox"/> WR 406	Seasonal Snow Environments	S	3	Junior or senior standing
<input type="checkbox"/> WR 416	Land Use Hydrology	F	3	GEOL 120 or GEOL 122 or GEOL 124 or GEOL 150 or SOCR 240; CIVE 202 or STAT 201 or STAT 301 or STAT 307 or STAT 315; PH 110 or PH 121 or PH 141
<input type="checkbox"/> WR 418	Land Use and Water Quality	S	3	CHEM 103; CHEM 104 or CHEM 107; CHEM 108 or CHEM 111; CHEM 112
<input type="checkbox"/> WR 474	Snow Hydrology	F	3	

PROCEDURES REQUIRED TO RECEIVE TRANSCRIPT DESIGNATION

- 1) Discuss your plans with your academic advisor. Be sure that you understand which courses you are required to take and how these courses will affect your schedule of classes for your major.
- 2) Complete an *Undergraduate Change of Major, Second Major, Minor, or Concentration* form. Forms are available from the CSU Registrar's Office or by contacting the SWIM Advisor with the CSU Water Center.
- 3) Schedule a meeting with the SWIM Advisor to obtain and complete a Plan of Study.
- 4) During each semester's preregistration advising session, you and your advisor should review your progress toward completion of the SWIM.
- 5) In the semester before the one in which you will graduate, you should alert the SWIM Advisor of your intention to graduate. The CSU Water Center will then certify that you have completed the courses required for the SWIM and notify the Office of Records and Transcripts. They will then add this certification to your transcript.

CONTACT INFORMATION

For more information contact Julie Kallenberger, SWIM Advisor, at julie.kallenberger@colostate.edu or visit www.watercenter.colostate.edu

Colorado State University does not discriminate on the basis of race, age, creed, color, religion, national origin or ancestry, sex, gender, disability, veteran status, genetic information, sexual orientation, gender identity or expression, or pregnancy. Colorado State University is an equal opportunity/equal access/affirmative action employer fully committed to achieving a diverse workforce and complies with all Federal and Colorado State laws, regulations, and executive orders regarding non-discrimination and affirmative action. The Office of Equal Opportunity is located in 101 Student Services.

COURSEWORK AND PROGRAM REQUIREMENTS

Issues surrounding water supply, water quality, and ecological water relationships are increasingly important as population growth continues and water uses multiply. The complexity of these issues, and competition among various water users, demands that students interested in pursuing careers in water gain a broad introduction to the issues while specializing within a particular discipline. CSU has considerable water resource expertise in many academic fields. The SWIM, which requires 21 credits and minimum of 12 upper-division (300- 400-level) courses allows undergraduates to take advantage of this expertise and broaden their backgrounds in order to prepare for employment or graduate-level work.

REQUIRED CORE COURSES (9 CREDITS)

- AREC/ECON 240 Issues in Environmental Economics (3)
- AREC 342 Water Law, Policy and Institutions (3)
- GR/WR304^P Sustainable Watersheds (3)

FOUNDATIONS OF WATER (6 CREDITS)

Select a minimum of 6 credits from the following course groups with no more than one course per group.

BIOLOGY:

- BZ 104 Basic Concepts of Plant Life (3) OR
- BZ 110 Principles of Animal Bioloov (3) OR
- BZ 120 Principles of Plant Biology (4) OR
- FW 204 Introduction to Fishery Biology (3) OR
- LIFE 103^P Biology of Organisms - Animals and Plants (4)

CHEMISTRY:

- CHEM 103 Chemistry in Context (3) OR
- CHEM 107^P Fundamentals of Chemistry (4) OR
- CHEM 113^P General Chemistry II (3)

GEOGRAPHY:

- GR 100 Introduction to Geography (3) OR
- GR/ESS 210 Physical Geography (3)

ECOLOGY:

- ESS 211^P Foundations in Ecosystem Science (3) OR
- ESS 311^P Ecosystem Ecology (3) OR
- LAND/LIFE 220^P Fundamentals of Ecology (3) OR
- LIFE 320^P Ecology (3)

GEOLOGY:

- GEOL 120 Exploring Earth: Physical Geology (3) OR
- GEOL 122 The Blue Planet: Geology of Our Environment (3) OR
- GEOL 124 Geology of Natural Resources (3) OR
- GEOL 150 Physical Geology for Scientists and Engineers (4)

PHYSICS:

- PH 110 Descriptive Physics (3) OR
- PH 121^P General Physics I (5) OR
- PH 141^P Physics for Scientists and Engineers I (5)

CONTEXT OF WATER (6 CREDITS)

Select a minimum of 6 credits from the following courses with no more than four credits per subject code¹.

SOCIOLOGICAL-ECONOMIC CONTEXT:

- GES 101 Foundations of Environmental Sustainability (3)
- AGRI/IE 270 World Interdependence - Population and Food (3)
- AREC 341^P Environmental Economics (3)
- CON 476² Sustainable Practices- Design and Construction (3)
- E 339^P Literature of the Earth (3)
- JTC 461^P Writing about Science, Health, & Environment (3)
- NR 320 Natural Resource History and Policy (3)
- PHIL 320 Ethics of Sustainability (3)
- PHIL 345 Environmental Ethics (3)
- POLS 361^P U.S. Environmental Politics and Policy (3)
- SOC 323^P Sociology of Environmental Governance (3)
- SOC 461^P Water, Society, and Environment (3)

ECOLOGICAL-BIOLOGICAL CONTEXT:

- BZ 321^P Aquatic Vascular Plants (3)
- BZ 415^P Marine Biology (4)
- BZ 471^P Stream Biology and Ecology (3)
- BZ 474^P Limnology (3)
- ERHS 320^P Environmental Health- Water and Food Safety (3)
- FW 300^P Biology and Diversity of Fishes (2)
- FW 400^P Conservation of Fish in Aquatic Ecosystems (3)
- LAND/HORT 368^P Landscape Irrigation and Water Conservation (3)

PHYSICAL CONTEXT:

- ATS 150 Science of Global Climate Change (3)
- CIVE 322^P Basic Hydrology (3)
- CIVE 330^P Ecological Engineering (3)
- CIVE 413^P Environmental River Mechanics (3)
- CIVE 423^P Groundwater Engineering (3)
- CIVE 440^P Nonpoint Source Pollution (3)
- GEOL 452^P Hydrogeology (4)
- SOCR 370^P Irrigation Principles (2)
- SOCR 371^P Irrigation of Field Crops (1)
- WR 406^P Seasonal Snow Environments (3)
- WR 416^P Land Use Hydrology (3)
- WR 418^P Land Use and Water Quality (3)
- WR 474 Snow Hydrology (3)

* Must have a minimum of 12 upper-division (300- 400-level) courses for the minor.

^P This course has at least one prerequisite. Check the Courses section of the CSU Catalog at <http://catalog.colostate.edu> to verify course prerequisites.

¹ No more than 4 credits per subject code may be counted toward the Context of Water requirement.

² Enrollment in CON 476 is limited to Construction Management majors only.