ENVIRONMENTAL SCIENCES, MS

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Please click here (http://catalog.ucdenver.edu/cu-denver/graduate/schools-colleges-departments/college-liberal-arts-sciences/geography-environmental-sciences/) to see Geography and Environmental Sciences department information.

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Overview

Environmental Sciences is a multidisciplinary study of the natural/physical environment. Academic fields involved in environmental sciences include chemistry, biology and ecology, physics, geology, geography, anthropology, engineering, political science, law, economics and the health sciences. Students planning to pursue the MS in Environmental Sciences must either have earned a bachelor's degree or have taken significant course work in the natural/physical sciences or engineering and completed several other prerequisites (see the following graduate information).

Environmental careers encompass a broad range of professions, from those with a strong foundation in the natural/physical sciences or engineering to those based in the social sciences and/or humanities. Students interested in environmental issues and careers should investigate all our program options and specializations before deciding which path to follow. At CU Denver, the MS in Environmental Sciences emphasizes the natural/physical sciences and engineering with the addition of the social sciences and humanities.

The MS in Environmental Sciences degree is designed to provide training in natural/physical sciences and social sciences. The goals of the program are (1) to enhance the interdisciplinary communication and analytical skills of the student, and (2) to provide a multidisciplinary approach for intensive and hands-on studies of particular environmental issues. Students will receive instruction in the physical and biological dynamics of various ecosystems, environmental engineering and socioeconomic issues associated with environmental analysis.

Graduates of the MS in Environmental Sciences program are involved in many different areas, such as reviewing environmental impact statements, monitoring groundwater quality or air quality and communicating with the public. Our students have great success finding employment in various agencies (U.S. Environmental Protection Agency, U.S. Geological Survey, Colorado State Department of Public Health and Environment) and private-sector environmental consulting and engineering firms.

These program requirements are subject to periodic revision by the academic department, and the College of Liberal Arts and Sciences reserves the right to make exceptions and substitutions as judged necessary in individual cases. Therefore, the College strongly urges students to consult regularly with their program advisor and CLAS advisor to confirm the best plans of study before finalizing them.

Core Faculty of the M.S. in Environmental Sciences Program

Professors:

Anne Chin, Geography and Environmental Sciences
Pamela Jansma, Geography and Environmental Sciences

Associate Professors:

Peter Anthamatten, Geography and Environmental Sciences
Christy Briles, Geography and Environmental Sciences
Frederick Chambers, Geography and Environmental Sciences
Rafael Moreno-Sanchez, Geography and Environmental Sciences
Brian Page, Geography and Environmental Sciences
Gregory Simon, Geography and Environmental Sciences
Bryan Wee, Geography and Environmental Sciences

Assistant Professors:

Benjamin Crawford, Geography and Environmental Sciences
Lisa Kelley, Geography and Environmental Sciences
Katharine Kelsey, Geography and Environmental Sciences

Associate Professors C/T:

Matthew Cross, Geography and Environmental Sciences

Assistant Professors C/T:

Thomas Duster, Geography and Environmental Sciences

Senior Instructors:

Amanda Weaver, Geography and Environmental Sciences

Instructors:

Kirsten Christensen, Geography and Environmental Science

Lecturers:

Alicia Cowart, Geography and Environmental Sciences
Richard DeGrandchamp, Geography and Environmental Sciences
Rudi Hartmann, Geography and Environmental Sciences

Faculty Affiliates to the M.S. in Environmental Sciences Program

Professors:

N.Y. Chang, Civil Engineering
Diana F. Tomback, Integrative Biology
David Mays, Civil Engineering
Michael J. Greene, Integrative Biology

Associate Professors:

Leo P. Bruederle, Integrative Biology
Greg Cronin, Integrative Biology
Yong Liu, Chemistry

Timberly M. Roane, Integrative Biology
Alan Vajda, Integrative Biology
Michael Wunder, Integrative Biology

Assistant Professors:

Brian Buma, Integrative Biology
Annika Mosier, Integrative Biology

Financial Aid

There are four types of financial aid available: student hourly teaching assistantship; research assistantship positions funded by grants to specific program faculty; paid internships and part-time employment organized through the department with professional organizations; and the regular package of financial aid (primarily loans) available through the financial aid office on the Denver campus. Our program also accommodates working students and offers many of core classes one/week or in the evening to accommodate work schedules. Incoming students will be automatically considered for program-distributed assistance at the time of admission to the program. Continuing students will be regularly apprised of available aid and positions. All other aid should be requested through the CU Denver Financial Aid Office, Student Commons Building 5th floor, Campus Box 125, P.O.Box 173364, Denver, CO 80217-3364. Telephone: 303-315-1850.

Internships

Students in the MS in Environmental Sciences program are strongly encouraged to contact the Experiential Learning Center for internships and paid positions related to environmental sciences. The Experiential Learning Center is located in the Tivoli Student Union, Suite 260. Telephone: 303-556-2250. The LynxConnect Career Center also located in the Tivoli Student Union Suite 439. Many students have had internships in federal agencies, such as the U.S. Environmental Protection Agency and the U.S. Geological Survey.

Program Requirements

1. Students must complete a minimum of 36 credit hours.
2. Students must complete a minimum of 36 graduate (5000-level) or higher credit hours.
3. Students must earn a minimum grade of B (3.0) or better in all core courses, a B- (2.7) in all other courses taken at CU Denver and must achieve a minimum cumulative program GPA of 3.0. All graded attempts in required and elective courses are calculated in the program GPA. Students cannot complete program or ancillary course requirements as pass/fail.
4. Students must complete all coursework with CU Denver faculty.

Program Restrictions, Allowances and Recommendations

1. Many of the elective courses have prerequisites; student must have met these requirements in order to take the course.
2. A given course may only be used for one option, even if it is listed in several options. Other courses maybe offered that will be acceptable as electives with approval of the option advisor and the director of the program.
3. Courses applied to either a certificate* or an MS degree may later be applied toward the other if all pertinent coursework is completed within a five year time period.
4. Students should fill out and submit all relevant department forms for their files. Importantly, all petitions for course substitutions and identification of where courses fit as electives, with the subsequent approval/denial, should be submitted to this file.
5. By the end of the first semester, each student should identify and declare whether or not s/he is pursuing the thesis or non-thesis option. If intending to pursue the thesis option, the student should identify and gain agreement from a content advisor for guiding the thesis, filling out and submitting the appropriate departmental form.
6. Students may count up to 6-credit hours of independent study, with a maximum of 3-credit hours per independent study towards elective credit in the major as approved by the Graduate Director. No more than 3 credit hours of independent study may be taken with the same instructor and they may not be taken in the same term.
7. Students may count up to 6-credit hours of internship in total, but 3-credit hours per internship and per entity (sponsorship may be with same professor sponsor).
8. Students may not count 4000-level courses towards electives in the program; this may be petitioned to the Graduate Committee in exceptional cases.
9. Students may take a maximum of 2 online courses, or petition to the GES Graduate Committee beyond two.
10. Students may enroll in thesis preparation and writing hours only after submission of a signed committee form, which requires approval of the thesis proposal.
11. Students will not receive a grade for thesis preparation and writing hours until the thesis is successfully defended.
12. Students must follow the graduate school deadlines for submission of paperwork for the graduation application, comprehensive exam, and any other deadlines. Links to these can be found on the GES/MS website.
13. Work submitted for the environmental sciences options must have a grade of B (3.0) or better.
14. All students must complete two (2) GES-approved, graduate-level techniques/methods-based class (not including the practicum).
15. Elective credits may be completed using up to three (3) credit hours of Independent Study and/or (3) credit hours of Internship Study.
16. The Geospatial, Environmental Education, and Sustainable Urban Agriculture options of the program lead towards independent graduate certificates. These certificates may be earned without entrance into the MS in environmental sciences program. (See the Geographic Information Science Graduate Certificate, Sustainable Urban Agriculture Graduate Certificate, and Environmental Science Education Graduate Certificate descriptions.)
17. The number of credits required to reach 36 total credits will depend on (a) whether a student is on Plan 1 or Plan 2, and (b) how many credit hours are compiled in the core classes.
18. See the MS in Environmental Sciences website for a complete list of elective courses. These include courses offered in both GES and our partner departments. The degree is offered through the College of Liberal Arts and Sciences with the cooperation of the College of Engineering, Design and Computing. In addition, some courses offered by the College of Architecture and Planning, the School of Public Affairs and the Business School are relevant and applicable to the program.

The MS in Environmental Sciences is a 36-hour program that provides students with two alternate plans: Plan I is a thesis path, while Plan II is a non-thesis path.

General requirements for the program include the following:

Required Courses

Code	Title	Hours
Take the following		*6*
ENVS 6002	Research Topics in Environmental Sciences	3
GEOG 5265	Sustainability in Resources Management	3
or GEOG 5440	Science, Policy and the Environment	

Physical/Ecological Core courses

Code	Title	Hours
Take at least four courses (12 credits), with one course from each of the content spheres: atmosphere, biosphere, hydrosphere, lithosphere/cryosphere.		*12*

Atmosphere

Code	Title	Hours
ENVS 5720	Climate Change: Causes, Impacts and Solutions	3
ENVS 5730	Air Quality Modeling and Analysis	3

Biosphere

Code	Title	Hours
ENVS 5010	Landscape Biogeochemistry	3
ENVS 5731	Mountain Biogeography	4
ENVS 5750	Beeography: Geography of Bees	4

Hydrosphere

Code	Title	Hours
ENVS 5280	Environmental Hydrology	4
ENVS 5410	Aquatic Chemistry	3
GEOG 5251	Fluvial Geomorphology	3
or GEOL 5251	Fluvial Geomorphology	

Lithosphere/Cyrosphere

Code	Title	Hours
ENVS 5340	Equity & Culture in Science Education: Local/Global	3
ENVS 5740	Soil Science and Geography	3
GEOG 5240	Applied Geomorphology	3

Electives

Code	Title	Hours
Take 12 credits from the following		*12*
BIOL 5154	Conservation Biology	3
BIOL 5335	Plant Science	4
BIOL 5345	Flora of Colorado	4
BIOL 5415	Microbial Ecology	3
BIOL 5460	Environmental Toxicology	3
BIOL 6764	Biological Data Analysis	4
CVEN 5333	Surface Water Hydrology	3
CVEN 5334	Groundwater Hydrology	3
CVEN 5335	Vadose Zone Hydrology	3
ENVS 5020	Earth Environments and Human Impacts	3
ENVS 5305	Water Quality and Resources	3
ENVS 5450	Urban Food and Agriculture: Perspectives and Research	3
ENVS 5460	Sustainable Urban Agriculture Field Study I	3
ENVS 5470	Sustainable Urban Agriculture Field Study II	3
ENVS 5650	Environmental Education	3
ENVS 5939	Internship	1-6
ENVS 6200	Risk Assessment	3
ENVS 6230	Environmental Epidemiology	3
ENVS 6800	Community-Based Research Practicum	3
ENVS 6840	Independent Study: ENVS	1-3
GEOG 5050	Applied Spatial Statistics	3
GEOG 5060	Remote Sensing I: Introduction to Environmental Remote Sensing	3
GEOG 5070	Remote Sensing II: Advanced Remote Sensing	3
GEOG 5080	Introduction to GIS	3
GEOG 5081	Cartography and Computer Mapping	3
GEOG 5085	GIS Applications for the Urban Environment	3
GEOG 5090	Environmental Modeling with Geographic Information Systems	3
GEOG 5091	Open Source Software for Geospatial Applications	3
GEOG 5092	GIS Programming and Automation	3
GEOG 5095	Deploying GIS Functionality on the Web	3
GEOG 5230	Hazard Mitigation and Vulnerability Assessment	3
GEOG 5235	GIS Applications in the Health Sciences	3
GEOG 5301	Population, Culture, and Resources	3
GEOG 5335	Contemporary Environmental Issues	3
GEOG 5350	Environment and Society in the American Past	3
GEOG 5420	The Politics of Nature	3
GEOG 5710	Disasters, Climate Change, and Health	3
GEOG 5995	Global Study Topics	3-9
GEOG 6700	Integrated Methods	3
GEOG 6800	Community-Based Research Practicum [1]	3

[1] Thesis students may also count ENVS 6800 Community-Based Research Practicum as an elective (the course is required for non-thesis students).

Degree Specializations

To fulfill the elective requirement, students may choose to fulfill one of the following Specialization Options offered in environmental sciences: Climate System; Ecosystems; Environmental Health; Environmental Science Education; Environmental Science, Policy and Management; Geospatial Analysis; Sustainable Urban Agriculture; or Water Systems. Students must have the prerequisites for each course and must meet the requirements listed in the notes below. Contact the option advisor for the particular option of interest before starting. Upon graduation, the option will be noted on the student's transcript.

Climate Systems

Advisors: Ben Crawford (Benjamin.Crawford@ucdenver.edu) & Kathy Kelsey (Katharine.Kelsey@ucdenver.edu)

Code	Title	Hours
Take all of the following courses:		*6*
ENVS 5500	Topics in Environmental Sciences (Urban Climate and Air Quality)	3
ENVS 5720	Climate Change: Causes, Impacts and Solutions	3

Code	Title	Hours
Take two of the following:		*6*
ENVS 5010	Landscape Biogeochemistry	3
ENVS 5730	Air Quality Modeling and Analysis	3
ENVS 5731	Mountain Biogeography	4
GEOG 5270	Glacial Geomorphology	3

Ecosystems

Advisor: Christy Briles (Christy.Briles@ucdenver.edu)

Code	Title	Hours
Take the following courses		*6*
BIOL 5415	Microbial Ecology	3
ENVS 5010	Landscape Biogeochemistry	3

Code	Title	Hours
Take two of the following		*6*
BIOL 5154	Conservation Biology	3
BIOL 5335	Plant Science	4
BIOL 5345	Flora of Colorado	4
BIOL 5415	Microbial Ecology	3
BIOL 5460	Environmental Toxicology	3
BIOL 6764	Biological Data Analysis	4
ENVS 5410	Aquatic Chemistry	3
ENVS 5720	Climate Change: Causes, Impacts and Solutions	3
ENVS 5740	Soil Science and Geography	3
ENVS 5750	Beeography: Geography of Bees	4
ENVS 5731	Mountain Biogeography	4

Environmental Health

Advisor: Peter (Peter.Anthamatten@ucdenver.edu)Anthamatten

Code	Title	Hours
Take a total of 12 credits from the following lists.		*12*
Take a minimum of one course from each list.		

Code	Title	Hours
Take one of the following methods courses		*3*
BIOS 6601	Applied Biostatistics I	3
GEOG 5235	GIS Applications in the Health Sciences	3
ENVS 6220	Toxicology	3
or EHOH 6616	Environmental & Occupational Toxicology	
ENVS 6230	Environmental Epidemiology	3
or EHOH 6617	Environmental & Occupational Epidemiology	

Code	Title	Hours
Take one of the following applications courses		*3*
EHOH 6619	Environmental Exposures and Health Effects	3
EHOH 6624	Infectious Diseases, Environmental Contexts	3
EHOH 6627	Water Quality and Public Health	3
EHOH 6635	Climate Change and Health	3
GEOG 5230	Hazard Mitigation and Vulnerability Assessment	3
GEOG 5710	Disasters, Climate Change, and Health	3

Environmental Science Education

Advisor: Bryan Wee (Bryan.Wee@ucdenver.edu)

Code	Title	Hours
Take the following		*6*
ENVS 5650	Environmental Education	3
GEOG 5150	Place, Landscape, and Meaning	3

Code	Title	Hours
Take two of the following		*6*
GEOG 5300	Children's Geographies	3
or ENVS 5300	Children's Geographies	
GEOG 5440	Science, Policy and the Environment	3
GEOG 5995	Global Study Topics	3-9
ENVS 5340	Equity & Culture in Science Education: Local/ Global	3
or SCED 5340	Equity & Culture in Science Education: Local/Global	

Environmental Science, Policy and Management

Advisors: Rafael Moreno (Rafael.Moreno@ucdenver.edu) and Gregory Simon (Gregory.Simon@ucdenver.edu)

Code	Title	Hours
Take the following courses		*6*
GEOG 5265	Sustainability in Resources Management	3
GEOG 5440	Science, Policy and the Environment	3

Code	Title	Hours
Take two of the following		*6*
GEOG 5230	Hazard Mitigation and Vulnerability Assessment	3
GEOG 5301	Population, Culture, and Resources	3
GEOG 5335	Contemporary Environmental Issues	3
GEOG 5420	The Politics of Nature	3
GEOG 5680	Urban Sustainability: Perspectives and Practice	3
GEOG 5710	Disasters, Climate Change, and Health	3
GEOG 5995	Global Study Topics	3-9
ENVS 5305	Water Quality and Resources	3
ENVS 6200	Risk Assessment	3

Geospatial Analysis Option

Advisors: Peter (Peter.Anthamatten@ucdenver.edu)Anthamatten or Rafael Moreno (Rafael.Moreno@ucdenver.edu)

Code	Title	Hours
Take the following		*6*
GEOG 5080	Introduction to GIS	3

GEOG 5090	Environmental Modeling with Geographic Information Systems	3

Code	Title	Hours
Take two of the following		*6*
CVEN 5385	GIS Relational Database Systems	3
GEOG 5050	Applied Spatial Statistics	3
GEOG 5091	Open Source Software for Geospatial Applications	3
GEOG 5092	GIS Programming and Automation	3
GEOG 5095	Deploying GIS Functionality on the Web	3

Sustainable Urban Agriculture

Advisor: Amanda Weaver (Amanda.Weaver@ucdenver.edu)

Code	Title	Hours
Take the following		*6*
ENVS 5450	Urban Food and Agriculture: Perspectives and Research	3
ENVS 5460	Sustainable Urban Agriculture Field Study I	3

Code	Title	Hours
Take two of the following		*6*
ENVS 5470	Sustainable Urban Agriculture Field Study II	3
GEOG 5060	Remote Sensing I: Introduction to Environmental Remote Sensing	3
GEOG 5085	GIS Applications for the Urban Environment	3
GEOG 5235	GIS Applications in the Health Sciences	3
GEOG 5640	Urban Geography: Denver and the U.S.	3
GEOG 5680	Urban Sustainability: Perspectives and Practice	3

Water Systems

Advisors: Anne Chin (Anne.Chin@ucdenver.edu) and Tom Duster (Thomas.Duster@ucdenver.edu)

Code	Title	Hours
Take the following		*7*
ENVS 5280	Environmental Hydrology	4
ENVS 5410	Aquatic Chemistry	3

Code	Title	Hours
Take two of the following		*6*
CVEN 5333	Surface Water Hydrology	3
CVEN 5334	Groundwater Hydrology	3
CVEN 5335	Vadose Zone Hydrology	3
CVEN 5401	Introduction to Environmental Engineering	3
ENVS 5305	Water Quality and Resources	3
ENVS 5380	Anthropocene Futures	3
GEOG 5240	Applied Geomorphology	3
GEOG 5251	Fluvial Geomorphology	3
GEOG 5270	Glacial Geomorphology	3

Thesis Option

Code	Title	Hours
Take the following		*6*
GEOG 6750	Research Design	3
GEOG 6950	Master's Thesis	1-6

Non-Thesis Option

Code	Title	Hours
Take an additional course from the lists above and the following		*6*
ENVS 6800	Community-Based Research Practicum	3

To learn more about the Student Learning Outcomes for this program, please visit our website (https://clas.ucdenver.edu/ges/programs/master-science/ms-learning-goals-objectives/).