ENVIRONMENTAL SCIENCE
GRADUATE PROGRAM

2020-2021 Curriculum Guide for Master of Science degree program with a specialization in WATER ISSUES

As a part of the Ohio State Environmental Sciences Graduate Program (ESGP), this specialization focuses on issues relating to water. Research on Earth's water is interdisciplinary and requires the ability to bridge social and natural sciences and engineering. The water issues specialization research areas include:

- Water quantity, hydrologic forecasting and remote sensing
- Water quality and the role of water in biogeochemical cycles
- The relationship between the human activities, aquatic ecosystems services and conditions, and public health
- Water contaminant fate and ecotoxicity
- Collaborative watershed planning and transboundary water governance

Students admitted to the MS degree program are assigned a faculty advisor who will provide guidance throughout the program. Students are encouraged to get to know their advisor and meet with him/her at least twice each semester. This document serves as a resource to be used by the student and the advisor in planning a program with a specialization in WI, but is not inclusive of all important degree, college(s), and university requirements. All students are expected to be familiar with the *ESGP Handbook* (https://esgp.osu.edu/sites/default/files/2020-08/esgp_handbook_2020-2021.pdf) and with *The Graduate School handbook* (available at http://www.gradsch.ohio-state.edu/).

PROGRAM OF STUDY

The MS-Water Issues curriculum consists of a minimum of 30 credits.

ESGP Required Courses (13 credits)

ENVSCI 7899	ESGP Seminar	1, 1, 1 (3 credits total)
ENR 8890.02	Ecological Restoration Seminar	1 credit
Biological Science	Select from courses in Appendix	3 credits
Physical Science	Select from courses in Appendix	3 credits
Social Sciences & Policy	Select from courses in Appendix	3 credits

Electives (3 credits)

With advisor's guidance	approval, select from the following list of ESGP courses	
and ENR 5280	Stream Ecology	4 credits
ENR 5345	Methods in Aquatic Ecology	4 credits
ENR 5355	Aquaculture	3 credits
ENR 7700	Watershed Ecology and Restoration	3 credits
CIVILEN 5230	Transport Phenomena in Water Resources Engineering	3 credits
CIVILEN 5420	Remote Sensing of Environment	3 credits
CIVILEN 6230	Numerical Models in Water Resources Engineering	3 credits
ENVENG 5120	Advanced Environmental Biotechnology	3 credits
ENVENG 6210	Environmental Engineering Unit Operations	3 credits
EARTHSC 5206	Advanced Oceanography	3 credits

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EARTHSC 5655	Land Surface Hydrology	3 credits
EARTHSC 5751	Quantitative Ground-Water Flow Modeling	4 credits
EARTHSC 5752	Contaminants in Aqueous Systems	4 credits
FABENG 5730	Design of Agricultural Water Management Systems	3 credits
FABENG 5750	Stream Geomorphology and Watershed Hydrology	3 credits

Research Credits (14 credits)

Research hours in advisor's home department	14 credits minimum

Grade Policy:

In addition to the general Graduate School requirements of a cumulative grade point average of 3.0 or higher, students must meet specific college policies regarding grades in courses.

Support Staff

Environmental Sciences Graduate Program

(614) 292-9762/Smith Laboratory/174 W. 18th Ave/Columbus, Ohio/43210/esgp.osu.edu

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Appendix

Core and Elective Courses in Biological Sciences

The objective of this core course area is to ensure that students are familiar with the diversity and functioning of organisms and the interactions among species and between organisms and the environment. Because the environmental sciences focus on the relationships between living organisms and their environment, the basic principles of ecology and a solid understanding of ecosystems structure and function is the focus of the ESGP core. This understanding can be gained through coursework that focuses on a particular taxon or a particular kind of ecosystem but must be broadly applicable to any environment.

Evolution, Ecology and Organismal Biology

EEOB 5420	Aquatic Ecosystems- Ecology of Inland Waters	1.5-4 credits	
EEOB 6210	Ecotoxicology	2-4 credits	

Environmental and Natural Resources

ENR 5250.01 and ENR 5250.02	Wetland Ecology and Restoration and Field Laboratory	3 credits	AU

Public Health

PUBHEHS 7360	Water Contamination: Sources and Health Impact	3 credits	

Core and Elective Courses in Physical Sciences

The objective of this core area is to provide an understanding of physical structure and processes in which ecosystems must function. Physical structure includes soil, water, air, geological media, climate, nutrients, and contaminants. Physical science processes include movement of "abiotic" matter and energy through ecosystems. Core courses must (1) study fundamental physical, hydrological, chemical, or biogeochemical processes and (2) study and emphasize the effects of physical structure and processes on ecosystem biotic components and function and the interactions between the biotic and abiotic components of the ecosystem.

Environment and Natural Resources

ENR 5273	Environmental Fate and Impact of Contaminants in Soil and Water	3 credits	SP

Civil and Environmental Engineering

CIVILEN 5130	Applied Hydrology	3 credits	
ENVENG 6100	Environmental Engineering Analytical Methods	3 credits	SP
ENVENG 5430	Principles of Risk Assessment	3 credits	SP

Earth Sciences

EARTHSC 5621	Introduction to Geochemistry	3 credits	AU
EARTHSC 5651	Hydrogeology	3 credits	AU
EARTHSC 5718	Aquatic Geochemistry	3 credits	

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Food, Agricultural and Biological Engineering

FABENG 5550	Design of Sustainable Waste Management Systems	3 credits	SP

Core and Elective Courses in Social Sciences and Policy

The objective of the social science core is to provide an understanding of concepts related to the study of human society and/or individuals and their relationships to the structure and function of the ecosystem(s) of which they are a part. Methodology includes a range of approaches, both qualitative and quantitative. Core social science courses must engage social science in a combined theoretical and/or applied study of a physical, cultural, regulatory, or economic relationship between humans and the natural and physical environment.

Environment and Natural Resources

ENR 5451	Water Law	3 credits	SP
ENR 8350	Ecosystem Management Policy	3 credits	AU

Law

Law 8890.02	Environmental Law	2-4 credits	AU

Water Issues Faculty

Heather Allen
Joel Barker
Nick Basta
Gil Bohrer
Larry Brown Ozeas
Costa Michael
Durand Casey Hoy
Rattan Lal
Roman Lanno
Jiyoung Lee
Allison MacKay
Andy May
Mark Moritz
Paula Mouser
Susan Olesik
Shaurya Prakash
Virginia Rich
Mazeika Sullivan
Linda Weavers
Dale White
Kelly Wrighton

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