MS in Natural Resources with Emphasis in Water Resources

The Water Resources emphasis area is an interdisciplinary graduate degree program encompassing all fields of natural sciences and, through collaboration, involves expertise from throughout the University of Missouri (MU). The geographic location of MU allows directed research to better understand water movement, biogeochemical cycling, biological and hydrologic processes of flowing and impounded waters in forested, prairie, agricultural and urban landscapes of the midcontinent.

The Water Resources graduate emphasis area offers an M.S. degree program specializing in the occurrence, circulation, distribution, chemical and physical properties, and environmental interaction of atmospheric, surface and subsurface waters. Specific areas of investigation often include (but are not limited to) precipitation floods and drought regimes, lakes and reservoirs, groundwater, water use, water quality, water contamination, plant water use, environmental measurement methods, hydrologic modeling and international water resources.

Participating faculty in the Water Resources emphasis area are engaged in both scientific understanding of water resources (physical, chemical and biological) and its management, and the decision-making processes used to address competing societal values (social, economic and legal). The program has no geographic boundaries but benefits from a distinct midcontinent climate, and physiography. Multi-use watersheds (e.g., forest, agriculture, urban), streams, lakes, rivers, wetlands and subsurface waters are ideal areas for basic and applied research that is easily transferable to other regions. The program provides Global impact by graduating highly qualified internationally aware water resources professionals.

Water Resources program applicants must meet the program requirements of the University of Missouri Graduate School for MS programs and meet any additional application criteria of the Water Resources graduate emphasis area. Water Resources graduate students are often supported by grant-funded research assistantships, scholarships or fellowships, teaching assistantships, or are self-funded. Other opportunities may be available to eligible students.

Upon successful completion of the School of Natural Resources Water Resources graduate program, students will possess strong technical skills in water resources and related sub-disciplines. Graduates will have developed a holistic understanding of the hydrologic cycle related to ecosystem processes and the interdisciplinary background necessary to understand and address contemporary water resources problems.

Degree Requirements

- 30 hours of course work must be completed
- 15 hours or more shall be 8000 level.
- Not more than 40 percent of the 30 hour credit requirement can be satisfied by a combination of special investigations, Research, Readings and/or Problems courses.
- The GPA of all course work submitted for the degree must be 3.0 or better.
- M.S. Students are required to publish at least one article in the primary literature stemming from their master’s thesis. In most cases, the article should be submitted to a peer reviewed journal prior to graduation.

Must take at least 6 credit hours from the following:

Aquatic Ecosystem Science

- F_W 8460 Wetland Ecology 3
- F_W 8520 Stream Ecology 3
- F_W 7400 Techniques for Fisheries Management and Conservation 3
- F_W 7100 Limnology 3-4
- F_W 8450 Advanced Limnology 3
- F_W 8550 Advanced Waterfowl Ecology 3

Climate and Climatology

- ATM_SC 7400 Micrometeorology 3
- ATM_SC 7520 Environmental Biophysics 3
- ATM_SC 7590 Radar Meteorology 3
- ATM_SC 8400 Atmospheric General Circulation 3
- ATM_SC 8600 Advanced Climate Dynamics 3

Environmental Chemistry

- ENV_SC 7318 Environmental Soil Chemistry 3
- ENV_SC 8500 Chemistry of the Vadose Zone 3
- F_W 7800 Environmental Toxicology 3

Hydrologic Science and Water Quality

- ATM_SC 7520 Environmental Biophysics 3
- ATM_SC 7550 Atmospheric Physics 3
- FORREST 8390 Physical Hydrology 3
- ENV_SC 7320 Hydrologic and Water Quality Modeling 3
- ENV_SC 7305 Environmental Soil Physics 3
- ENV_SC 7306 Environmental Soil Physics Laboratory 2
- ENV_SC 8400 Solute Transport in the Vadose Zone 3

Water Management Technology

- NAT_R 8290 Hydrologic Measurement and Synthesis 2
- ATM_SC 7510 Remote Sensing for Meteorology and Natural Resources 3
- ATM_SC 7590 Radar Meteorology 3

Watershed Science and Management

- FOREST 7390 Watershed Management and Water Quality 3
- FOREST 8620 Plant-Water Relations 3
- FOREST 8625 Plant-Water Relations Laboratory 2

Elective Courses

- AG_EC 7356 Environmental Law and Policy 3
- AG_S_M 7420 Surface Water Management 3
- AG_S_M 7440 Water Quality and Pollution Control 3
- AG_S_M 7460 Irrigation and Drainage 3
- BIOL_EN 8150 Natural Systems for Wastewater Treatment 3
- BIOL_EN 8250 Water Management Theory 3
- CV_ENG 7230 Introduction to Water Quality 3
- CV_ENG 7240 Water Quality Analysis 3
- CV_ENG 7290 Wastewater Treatment and Process Design 3
- CV_ENG 7700 Hydraulics of Open Channels 3
- CV_ENG 7703 Applied Hydrology 3
- CV_ENG 7710 Soil and Water Conservation Engineering 3
- CV_ENG 7720 Watershed Modeling Using GIS 3
- CV_ENG 7792 Analysis of Water-Resource Systems 3
- CV_ENG 8200 Water Quality Modeling 3
### Thesis Requirements

A thesis shall be completed before the final examination. Research credits toward a thesis normally shall not exceed eight hours. A final oral examination is provided by all candidates before completion of the degree.

Every candidate should review the “Guidelines for Preparing Theses and Dissertations” from the Graduate School and consult the Water Resources Director of Graduate Studies for academic program style requirements.

### Thesis defense seminar

All students must present a defense seminar in advance of his/her final examination. The seminar must be publicized and the Director of Graduate Studies needs to be informed of the date as soon as the student arranges it, at least two weeks before the seminar. If the seminar is not appropriately announced, it may be considered invalid.

### Admissions

#### Admission Contact Information

School of Natural Resources  
Water Resources Emphasis Area  
203-Q Anheuser-Busch Natural Resources Building  
(573) 884-7732

#### Director of Graduate Studies:

Dr. Jason A. Hubbart  
203-Q ABNR Building  
(573) 884-7732

Applicants are required to meet two sets of minimum qualifications for admission: the requirements of the MS in Natural Resources with emphasis in Water Resources (http://gradstudies.missouri.edu/academics/programs/natural-resources/ms-water-resources-emphasis.php) program and the minimum requirements of the Office of Graduate Studies (http://gradstudies.missouri.edu/admissions/eligibility-process/minimum-requirements). Because requirements vary, you must refer to a degree program's graduate admission page to learn about specific admission criteria, application deadlines, eligibility and application process. Your application materials will be reviewed by both the Office of Graduate Studies and the degree program to which you've applied before official admission to the University of Missouri.