MS in Natural Resources with Emphasis in Water Resources

The Water Resources emphasis area is an interdisciplinary graduate degree program within the School of Natural Resources. It encompasses all fields of natural sciences represented in the School and, through collaboration, involves related expertise from throughout the University of Missouri and beyond. Participating faculty in the Water Resources emphasis area are engaged in both the scientific understanding of water resources (biological, chemical and physical) 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 the location of MU suggests most research will be directed to better understanding of water movement, biogeochemical cycling and biological processes of forested-agricultural and urban landscapes of the midcontinent. The lakes, rivers, streams, wetlands and subsurface waters of the region are prime areas for basic and applied research. One of the program's major global impacts is the training of highly qualified graduate professionals that are equipped to address many of the complex contemporary water resource problems around the world.

The Water Resources graduate emphasis area offers M.S. degree programs specializing in (but not limited to) the occurrence, circulation, distribution, chemical and physical properties, and environmental interaction of surface and subsurface waters, including groundwater. Specific areas of investigation could include lakes and reservoirs, floods and droughts, groundwater aquifers, water use, water quality, water contamination, plant water use, 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 (biological, chemical and physical) 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. One of the program's major global impacts is the training of highly qualified graduate professionals that are equipped to address many of the complex contemporary water resource problems around the world.

Water Resources program applicants must meet the general requirements set forth by the University of Missouri Office of Graduate School for the M.S. degree, and meet any additional application criteria of the Water Resources graduate emphasis area. Students often self-fund, apply for teaching assistantships, or are supported by grant-funded research assistantships. Other opportunities may be available to eligible students. Applicants should contact specific faculty to determine the availability of position(s) in the potential advisor's research program and assistantships or scholarships prior to applying. If encouraged to apply by Water Resources faculty, please apply through the University of Missouri's online application program.

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 as and the interdisciplinary background necessary to understand and address contemporary water resources problems. Graduates will have an appreciation of the complex interactions of biophysical processes and tightly coupled socioeconomic interactions necessary to implement water resource policy.

Degree Requirements

- 30 hours of course work must be completed, and 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.
- A maximum of 20 percent of the number of credit hours required for a student's degree may be graduate credits transferred from another university, including another campus of the University of Missouri system upon the recommendation of the adviser, the approval of the academic program director of graduate studies and the MU Office of Graduate Studies.
- Students must maintain a GPA of 3.0 (A=4.0) in all course work presented for the degree.
- Each student's coursework requirements, including the selection of specific courses, will be listed in the student's plan of study and approved by their graduate committee.
- A minimum of one credit hour of graduate seminar must be included in each student's graduate program.

Must take at least 6 credit hours from the following:

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<thead>
<tr>
<th>Aquatic Ecosystem Science</th>
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<tbody>
<tr>
<td>F_W 8460 Wetland Ecology</td>
<td>3</td>
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<td>F_W 8520 Stream Ecology</td>
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<tr>
<td>NAT_R 7001 Topics in Natural Resources</td>
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<tr>
<td>NAT_R 7100 Lake Ecology</td>
<td>3</td>
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<td>FOREST 7390 Watershed Management and Water Quality</td>
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<tr>
<td>NAT_R 7300 Methods in Aquatic Ecology</td>
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<tr>
<td>NAT_R 8450 Advanced Limnology (offered Spring 2020)</td>
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<th>Climate and Climatology</th>
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<td>ATM_SC 7400 Micrometeorology</td>
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<tr>
<td>ATM_SC 7590 Radar Meteorology</td>
<td>3</td>
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<tr>
<td>ATM_SC 9300 Introduction to Chaos Theory</td>
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<tr>
<td>ATM_SC 8400 Atmospheric General Circulation</td>
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<td>ATM_SC 8600 Advanced Climate Dynamics</td>
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<th>Hydrologic Science and Water Quality</th>
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<tr>
<td>ATM_SC 7550 Physical Meteorology</td>
<td>3</td>
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<tr>
<td>ENV_SC 7320 Hydrologic and Water Quality Modeling</td>
<td>3</td>
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<tr>
<td>CV_ENG 7710 Soil and Water Conservation Engineering</td>
<td>3</td>
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<tr>
<td>GEOL 7100 Groundwater Hydrology</td>
<td>3</td>
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<tr>
<td>GEOL 7130 Groundwater Modeling</td>
<td>3</td>
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<tr>
<td>GEOL 8240 Hydrogeologic Processes</td>
<td>3</td>
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<tr>
<td>ENV_SC 7305 Environmental Soil Physics</td>
<td>3</td>
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<td>ENV_SC 7306 Environmental Soil Physics Laboratory</td>
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<tr>
<td>ENV_SC 8400 Solute Transport in the Vadose Zone</td>
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<th>Water Management Technology</th>
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<tr>
<td>NAT_R 8290 Hydrologic Measurement and Synthesis</td>
<td>2</td>
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ATM_SC 7510 Remote Sensing for Meteorology and Natural Resources 3
ATM_SC 9590 Advanced Applications of Weather Radar 3
ATM_SC 7590 Radar Meteorology 3

Elective Courses
AG_S_M 7420 Surface Water Management 3
AG_S_M 7440 Water Quality and Pollution Control 3
BiOL_EN 8250 Water Management Theory 3
AG_S_M 7460 Irrigation and Drainage 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 8200 Water Quality Modeling 3
CV_ENG 8215 Environmental Transport Phenomena 3
CV_ENG 8225 Aquatic Chemistry 3
CV_ENG 8270 Design of Water and Wastewater Treatment Facilities 3
GEOL 7300 Introduction to Low-Temperature Geochemistry 3
GEOL 7500 Organic Geochemistry 3

Thesis Requirements
Forms and Timelines
M1 Plan of study for Master's Degree
Together with his /her advisor, the student completes the M1 form and provides it to the Director of Graduate Studies in the emphasis area. This form provides the student, the school, and the MU Office of Graduate School with a plan for all course work, transfer credit and research hours that will comprise a student's program of study. This form should be completed by the end of the second semester.

M2 Request for Thesis Committee
The M2 form accompanies the M1, and should be submitted at the same time, by the end of the second semester. It is required of students who will be writing a thesis.

M3 Report of Master's Examining Committee
The M3 form reports the final results of 1) master's thesis defense 2) master's project presentation or 3) master's comprehensive examination. Submit to the MU Office of Graduate Studies as soon as possible after the exam, project presentation or thesis defense.

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 will be considered invalid.

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 (http://gradschool.missouri.edu/academics/thesis-dissertation/diss-thesis-guideline)” from the Graduate School and should consult the Water Resources Director of Graduate Studies for academic program style requirements.

M.S. Committee Meeting Minimum Requirements
M.S. Students must meet with their committee at least twice during their degree seeking program.

First meeting: Present a written research proposal, provide a proposal presentation to the committee and present their M1, and M2 for approval and signing.


Admissions
Admission Contact Information
School of Natural Resources
Water Resources Emphasis Area
303L Anheuser-Busch Natural Resources Building
(573)-882-2832

Director of Graduate Studies:
Rebecca North, Ph.D.
Assistant Professor of Water Quality
School of Natural Resources
University of Missouri
303L Anheuser-Busch Natural Resources Building
Columbia, MO. 65211-7220
(573)-882-2832

Admission Requirements

• Bachelor's degree in a relevant discipline from an accredited institution
• Undergraduate GPA: 3.0 on a scale of 4.0 in last 60 hours
• Graduate Record Exam (GRE)*
• Minimum TOEFL scores: 550 (paper-based test), 80 (Internet-based test), 6.5 (IELTS Academic)
• Experience in research or management of water resources. Practical skills are strongly considered.

* Students whose GPAs do not meet the requirements will be evaluated individually. Applicants will be reviewed on a case-by-case basis.

How to Apply
For the Office of Graduate School:
Completed Graduate School online application

Unofficial Transcripts- As part of the application submission process, all applicants are required to upload unofficial copies of all post-secondary transcripts to the online application. Official transcripts are only required if accepted by the academic program.

Official Results of English Proficiency Exams (International applicants only)

For the Water Resources Program:
All application materials must be submitted to the Graduate Studies online application system.
A minimum of three letters of recommendation and the accompanying evaluation sheets from people who can attest to the candidate’s scholastic and water resources related field work abilities

Résumé or CV

Letter of professional goals (2 page limit), indicating education, research and career goals

Publications (optional)

GRE scores

TOEFL scores (when applicable)

Applicants should contact specific faculty to determine the availability of potential advisors, available position(s) in the potential advisors lab and of available research assistantships prior to applying.

An applicant contemplating graduate work in water resources should have a strong background in physical sciences, including calculus, chemistry, and physics. Those considering interdisciplinary degrees should also have a background in biology, botany, zoology, ecology and other natural sciences. A background of 25 to 30 hours in physical sciences courses is desirable. Minor deficiencies may be remedied during the graduate program; major deficiencies may require preparatory coursework prior to consideration for admission. 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 (https://gradstudies.missouri.edu/degreecategory/natural-resources) and the minimum requirements of the Office of Graduate Studies (https://gradstudies.missouri.edu/admissions/eligibility-process). 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.

**Application Deadlines**

We have a rolling application window.

**Financial Aid from the Program**

Funding is available, but assistantships are highly competitive. Prospective students must complete all the necessary application requirements to be considered for funding. Contact the graduate program emphasis coordinator for more details. Applicants should also contact the faculty they want to work with to determine the availability of possible graduate assistantship positions.