# FRESHWATER SCIENCES, PHD

The School of Freshwater Sciences offers unique graduate programs designed to provide students with advanced training in four key areas: Water Policy and Economics, Water Ecosystems and Human Health, Great Lakes Research and Management, and Water, Weather, and Climate. These interconnected fields combine biological, physical, technological, and policy perspectives to tackle the most pressing environmental challenges.

## Master of Science (MS) Tracks

### Aquatic Science (Professional) Track

Become a freshwater expert capable of solving complex environmental problems and protecting vital water resources. Through hands-on fieldwork, lab training, and an internship, students gain practical experience in areas like fish health and management, water quality monitoring, ecosystem analysis, and environmental health. This immersive approach equips students with the skills needed to address real-world challenges in freshwater systems. Students in the professional program are not supported by assistantships.

### Aquatic Science (Thesis) Track

Students interested in research, water ecology, and developing innovative solutions, the thesis track provides an interdisciplinary, research-focused education. Students work closely with faculty to conduct original research, develop new technologies, and contribute to advancing freshwater science. Students in the thesis program must secure a faculty advisor who will serve as the major professor and provide a graduate assistantship.

### Water Policy (Professional) Track

Become a leader in water policy by analyzing scientific and economic data to create policies that address environmental challenges. This program equips students with the skills needed to work in policy consulting and environmental management. Students gain real-world experience through a practicum in water policy and an internship. Students in the professional program are not supported by assistantships.

### Water Policy (Thesis) Track

For those interested in water economics and policy, the thesis track offers an interdisciplinary approach, preparing students for careers in research, industry, or further PhD studies. Students will work with experts to conduct original research and develop impactful water policies. Students in the thesis program must secure a faculty advisor who will serve as the major professor and provide a graduate assistantship.

## Doctor of Philosophy (PhD) Program

The PhD in Freshwater Sciences focuses on interdisciplinary research and provides the training necessary for a career in academia, research, or industry. All graduates secure jobs in water-related fields, often leading groundbreaking research that shapes water policy and management. Doctoral students will work alongside top freshwater scientists, contributing to important research while focusing on a specific area of study. Students in the PhD program must secure a faculty advisor who will serve as the major professor and provide a graduate assistantship.

At the School of Freshwater Sciences, students gain the skills, knowledge, and experience to drive real-world solutions for freshwater challenges. Join a community of passionate scholars and make a lasting impact on the world's most vital resource.

## Admission Requirements

### Application Deadlines

Application deadlines vary by program, please review the application deadline chart (http://uwm.edu/graduateschool/program-deadlines/) for specific programs. Other important dates and deadlines can be found by using the One Stop calendars (https://uwm.edu/onestop/dates-and-deadlines/).

### Admission

#### Prerequisite Coursework

The following prerequisites are strongly recommended:

1. At least one semester coursework in three of the following four areas: chemistry, biological sciences, physics, and calculus.
2. One additional semester of chemistry, biological sciences, or physics.

Admission will be considered based upon the applicant's academic and/or professional background, proposed course of study, and possible additional coursework once in the degree program, should important preparatory gaps be identified.

### Other Requirements

An applicant must meet Graduate School requirements (http://uwm.edu/graduateschool/admission/) plus the following program requirements to be considered for admission:

- A degree in biology, chemistry, economics, geosciences, mathematics, physics, public policy or other appropriate natural science, social science or engineering discipline.
- An undergraduate GPA of at least 3.0 (4.0 basis).
- Submission of scores on the General Test of the Graduate Record Examination (http://uwm.edu/graduateschool/admission/#gre).
- Three letters of recommendation from persons familiar with the applicant's scholarship, research achievements and potential.
- Submission of a Reason Statement. Statements are used to determine the appropriateness of your educational and professional goals and serves as an example of your ability to express yourself in writing. Your reason statement should include:

    1. your reasons for pursuing graduate study
    2. your specific background interests and background in the field
    3. any relevant skills or training you've acquired
    4. any academic awards or honors you have received
    5. the name(s) of faculty members with whom your research interests most closely align

A master's degree is not a prerequisite for admission to the PhD program.

Students in the PhD program must be accepted by a faculty member who will serve as the major professor, and be primarily responsible for matriculation. Acceptance or agreement by a faculty member does not constitute formal acceptance into the School of Freshwater Sciences.

Applicants are strongly encouraged to communicate with prospective major professors early in the admission process.

### Reapplication

A student in the MS program, or who receives the master's degree at UWM, must formally reapply for admission to the Graduate School before continuing studies toward the PhD.

## Credits and Courses

Students must earn 54 credits beyond the bachelor's degree, of which 24 credits may be taken from formal coursework completed as part of a master's degree. A minimum of 27 credits must be earned in residence at UWM. Students may take up to a maximum of 6 credits of independent study counting toward the degree.

| Code | Title | Credits |
|---|---|---|
| **Required** | | |
| FRSHWTR 585G | Applied Water Statistics and Data Manipulation | 3 |
| FRSHWTR 890 | Science Communication | 3 |
| FRSHWTR 900 | Colloquium in Freshwater Sciences (taken twice, 1 credit each) | 2 |
| **Select one of the following:** | | **3** |
| FRSHWTR 502G | Aquatic Ecosystem Dynamics | |
| FRSHWTR 504G | Quantitative Freshwater Analysis | |
| FRSHWTR 506G | Environmental Health of Freshwater Ecosystems | |
| FRSHWTR 510G | Economics, Policy and Management of Water | |
| **Electives** | | **15** |
| Select 15 credits in consultation with the students major professor | | |
| **Research, Dissertation, Independent Study, or Remaining Electives** [1] | | **28** |
| FRSHWTR 990 | Doctoral Research and Dissertation | |
| FRSHWTR 999 | Independent Study | |
| **Total Credits** | | **54** |

[1] Electives may be selected in consultation with the student's major professor.

A Program of Study, including coursework and proposed research, is planned by the student in consultation with the major professor, and must be approved by the Committee. A student must present an annual progress report and an updated plan of study to their Doctoral Advisory Committee. For students entering with advanced degrees, some of the coursework may already be completed. Requests for counting previously taken courses toward the degree requirements will be evaluated on a case-by-case basis. A minimal grade point average of 3.00 must be earned in coursework, not including research or seminars.

## Additional Requirements

### Residence

The student must meet Graduate School residence requirements (https://uwm.edu/graduateschool/students/academic-policies-and-procedures/doctoral-resources/doctoral-requirements/).

### Major Professor as Advisor

The student must have a major professor to advise and supervise the student's studies as specified in Graduate School regulations. Appointment of a major professor will be based on compatibility between a student's preferred research area or area of specialization and a professor's area of specialization.

### PhD Advisory Committee

The membership of the PhD Advisory Committee will be established by the end of the student's first year. PhD committees must have at least four members, including the major professor. At least three of the committee members must be UWM graduate faculty, at least two of which are from the School of Freshwater Sciences. The committee must have at least one external member that possesses the appropriate expertise and is approved by the Academic Program and Curriculum Committee of the School of Freshwater Sciences. Dissertators are allowed a maximum of six committee members for the defense. The Committee must meet at least once a year to monitor and formally report to the faculty on the student's academic and research progress.

### Doctoral Preliminary Examination

The preliminary examination must be passed by the end of the second year for the student to continue in the program. Extensions of this deadline must be approved by the PhD Advisory Committee. The examination is in two parts: written and oral. The content of the examination is determined in advance by the student's Advisory Committee, and will include subject matter that is broadly related to the area of research that the student will specialize in, as well as content related to the core courses. The Doctoral Committee decides by simple majority whether the student passes, fails, or must retake part or all of the examination. At the discretion of the Committee, a student who fails the examination may be allowed one additional attempt of all or part of the examination. After successful completion of the preliminary examination, the student concentrates on the development and execution of original research.

### Dissertation Proposal Hearing

Following successful completion of the doctoral preliminary examination, the student submits a written dissertation proposal to the student's PhD Advisory Committee. The proposal must be submitted within one semester of the successful completion of preliminary exams, and defended by the end of the following semester. Extensions of this deadline must be approved by the PhD Advisory Committee.

### Dissertator Status

Specific requirements which must be completed before the Graduate School places a doctoral student in dissertator status are described in the Doctor of Philosophy Degree (https://uwm.edu/graduateschool/students/academic-policies-and-procedures/doctoral-resources/doctoral-requirements/) requirements section.

### Dissertation

During the final year of study, the candidate must present a public seminar on the dissertation research and subsequently prepare and successfully defend a dissertation reporting the results of the candidate's research to the Committee. The original research findings embodied in this dissertation are expected to be accepted for publication in one or more refereed journals.

Please see the Graduate School thesis and dissertation formatting requirements for further information.

### Dissertation Defense

As the final step toward the degree the candidate must defend the dissertation before the PhD Advisory Committee.

### Time Limit

All degree requirements must be completed within ten years from the date of initial enrollment in the doctoral program.

## Freshwater Sciences PhD Learning Outcomes

Students graduating from the Freshwater Sciences, PhD program will be able to:

- **Conduct** independent, cutting-edge research that, through the application of existing and development of novel theory and methods, results in one or more original contributions to understanding a specific scientific field pertaining to freshwater. This requires critical thinking, creativity, and a mastery of appropriate analysis, interpretation, and synthesis techniques.
- **Communicate, collaborate, and engage** with professionals from various disciplines, including natural scientists, engineers, social scientists, managers, business leaders, policymakers, and the broader community.

### Contact Information

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uwm.edu/freshwater (http://uwm.edu/freshwater/)