

# FRESHWATER SCIENCES, PHD

The School of Freshwater Sciences offers a graduate program of studies providing students with advanced training and education in four areas:

- Freshwater System Dynamics
- Human and Ecosystem Health
- Freshwater Technology
- Freshwater Policy and Economics

Each of these focus areas is interrelated with the others, and includes biologic, physical, technologic and policy aspects of freshwater.

The Master of Science program has two tracks designed to provide a strong foundation necessary for the training of graduates that will utilize novel approaches to the sustainable and equitable use and management of freshwater systems worldwide. The Doctor of Philosophy program is a research degree designed to explore and discover novel approaches to the sustainable and equitable use and management of freshwater systems worldwide. These programs will create an interdisciplinary atmosphere for training the next generation of scientists armed with the knowledge, skills and experience to anticipate and address the freshwater issues of the future.

Timely application is encouraged for students seeking financial support. When applying for admission, applicants should describe as completely as possible their specific research interests within freshwater sciences. Applicants are strongly encouraged to establish contact, before or during the application process, with Freshwater Sciences faculty members whose research interests are closest to their own, regarding the likelihood of one serving as the student's major professor.

## 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:

1. A degree in biology, chemistry, economics, geosciences, mathematics, physics, public policy or other appropriate natural science, social science or engineering discipline.
2. An undergraduate GPA of at least 3.0 (4.0 basis).

3. Submission of scores on the General Test of the Graduate Record Examination (<http://uwm.edu/graduateschool/admission/#gre>).
4. Three letters of recommendation from persons familiar with the applicant's scholarship, research achievements and potential.

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

### For students admitted Spring 2018 and after

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 9 credits of independent study counting toward the degree.

Code	Title	Credits
<b>Required</b>		<b>5</b>
FRSHWTR 900	Colloquium in Freshwater Sciences (Taken twice, 1 credit each)	
ENGLISH 890	Science, Communications, & Public Engagement	
<b>Select four of the following</b>		<b>12</b>
FRSHWTR 502	Aquatic Ecosystem Dynamics	
FRSHWTR 504	Quantitative Freshwater Analysis	
FRSHWTR 506	Environmental Health of Freshwater Ecosystems	
FRSHWTR 508	Aquatic Technologies	
FRSHWTR 510	Economics, Policy and Management of Water	
<b>Select one of the following</b>		<b>3</b>
FRSHWTR 513	Field Experimentation and Analysis in Freshwater Sciences	
FRSHWTR 514	Analytical Techniques in Freshwater Sciences	
<b>Electives</b>		<b>17</b>
Select 17 credits in consultation with the students major professor		
<b>Doctoral Research and Dissertation Credits</b>		<b>17</b>
FRSHWTR 990	Doctoral Research and Dissertation	
<b>Total Credits</b>		<b>54</b>

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 his or her 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.

### **For students admitted Fall 2017 and before**

You 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.

You are required to take two integrative Seminar courses (FRSHWTR 901) and two Freshwater Sciences Practicum courses (FRSHWTR 512), as well as Quantitative Freshwater Analysis (FRSHWTR 504). In addition, you must complete at least 9 credits of dissertation research. Elective courses are selected in consultation with your PhD committee. A minimum of 27 credits must be earned in residence at UWM. You may take up to a maximum of 9 credits of independent study counting toward the degree.

You must be proficient in at least three of the four areas of study: 1. freshwater systems, 2. human/ecosystem health, 3. freshwater technology, and 4. freshwater policy and economics. To meet this requirement, core courses are offered in each of these respective areas:

Code	Title	Credits
FRSHWTR 502	Aquatic Ecosystem Dynamics	3
FRSHWTR 506	Environmental Health of Freshwater Ecosystems	3
FRSHWTR 508	Aquatic Technologies	3
FRSHWTR 510	Economics, Policy and Management of Water	3

## **Program Requirements**

### **Residence**

The student must meet Graduate School residence requirements (<http://uwm.edu/graduateschool/doctoral-requirements/#residence>).

### **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. The Committee must consist of five members including the doctoral student's advisor as chair (or co-advisors as co-chairs). A minimum of three members must be from UWM, at least two graduate faculty members from the School of Freshwater Sciences, and two additional members, with consideration given to the inclusion of an external, non UWM member. 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 (<http://uwm.edu/graduateschool/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.