

**Department of Hydrology & Water Resources**

**The Accelerated Master's Degree in  
Hydrology**

**REQUIREMENTS**

*(Updated June 2017)*

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## BASIC INFORMATION

### **Overview and Timeline**

The Accelerated Master's Program (AMP) in HWR is a program designed to enable advanced UA undergraduate students to complete both the Bachelor of Science degree in ***Environmental Hydrology & Water Resources*** as well as the Master of Science degree in ***Hydrology*** in a total of 5 years. This program is currently only available to students who are doing a Bachelor of Science in Environmental Hydrology. This program is not open to students who have completed a Bachelor's degree or an advanced degree from another institution.

AMP students focus on completing undergraduate-level courses their first three years. By the midpoint of the junior year (1 December), students must submit an application to the AMP program. After acceptance to the Accelerated Master's Program (in late December), students register to take a combination of undergraduate and graduate courses during the fourth year to complete their Bachelor's degree. During this time, students complete both undergraduate and graduate courses, and begin to develop their research ideas in preparation for graduate-level research. In the fifth and final year, students focus on graduate course work and their research-based thesis in order to complete the requirements for the Master's degree.

### **Who should pursue the AMP?**

The AMP is well-suited for students who wish to pursue hydrology and water resources at the graduate level and for students who wish to move into a career in the hydrology and water resources.

### **Eligibility Criteria**

To be considered eligible to apply for the Accelerated Master's Program in HWR, students must:

- Be a continuing University of Arizona undergraduate.
- Have a minimum cumulative GPA of 3.3.
- At the time of application, have completed a minimum of 75 units of undergraduate course work; a minimum of 12 undergraduate units must have been completed in the student's major at University of Arizona's main campus.
- At the time of acceptance into the program, have at least two semesters of undergraduate course work remaining to complete before being granted the Bachelor's and have fulfilled required components of the AMP curriculum to date.
- Demonstrate the maturity necessary to succeed in an accelerated, highly-competitive program.

### **UA Graduate College's Policies Regarding the AMP**

Students will be considered undergraduates until they complete their undergraduate requirements, which should be no later than the end of their fourth year. Students must take at least 12 of their graduate credits while in graduate status. In other words:

- During years 1-3 (or approximately 0-90 credits) students will be taking undergraduate coursework and charged at the undergraduate rate.
- Once admitted to the AMP, they may take up to 12 units of graduate coursework during the senior (or transition year), which may apply toward both the bachelor's and the master's degrees. Students will be charged at the undergraduate rate and retain eligibility for undergraduate scholarships.
- After completion of all bachelors' requirements, students will be granted graduate status, be charged at the graduate rate, and be eligible for graduate assistantships.

- Should a student have completed 12 graduate credits, but not yet completed the undergraduate degree, they will be considered graduate for financial aid and tuition purposes and coded as 'graduate' in UAccess. They will no longer be eligible for undergraduate scholarships. Nor will they be eligible for graduate assistantships.
- At least 12 graduate credits must be taken while in graduate status, after completing all degree requirements for the bachelor's. A total of 30-31 graduate credits should be taken as described in the HWR Master of Science Handbook.
- Students should be encouraged to complete their undergraduate requirements as soon as possible, but not later than one semester before receiving their master's.

## **Applying to the AMP**

During the Fall semester of the third year, students will need to officially apply to the Department of Hydrology & Water Resources (<http://www.hwr.arizona.edu/>) for entrance to the AMP. The deadline for applicants is 1 December and students will be notified by 31 December whether they have been accepted into the program.

## **Registering For 500-Level Courses As An Undergraduate**

Before AMP students have completed their Bachelor's degree, they should register for 500-level courses using a 500 Level Course Petition: (<http://grad.arizona.edu/system/files/500%20Level%20Petition.pdf>). Students are to mark that they wish to enroll in the Accelerated Master's Program (AMP) for their course work, obtain instructor permission, and have the HWR Graduate Director sign off on the form before submitting it to the Graduate College and then finally to the Registrar's Office. One form must be used for each semester students wish to register for graduate level courses. Up to 12 units of these courses will be used to apply towards both the Bachelor's degree and the Master's degree.

## **Applying to the Graduate College**

During the fourth year, students will need to officially apply to the UA Graduate College (<http://grad.arizona.edu/admissions/apply-now>). For Fall semester applications, the deadline is 1 February for both domestic and international applicants. For Spring semester applications, the deadline is 1 October for domestic applicants, and 1 August for international applicants. In response to the question "To what degree program and major are you seeking admission?" students should list "Master of Science, HWR." Students must apply online.

## **Research and the AMP**

AMP students should have a research advisor who is either an HWR tenure-track, joint, or research faculty member. Ideally, the research project should be started at least during the summer prior to the student's fourth year, and the student should then enroll in the Senior Capstone course (HWRS 498) during the fall and spring semesters of the fourth year. The research that a student conducts during his or her time as an undergraduate may serve as a foundation upon which the Master's research will be built. Hence, it is preferable that student's undergraduate research advisor will continue as the student's research advisor, and that the student's thesis/manuscript will be a culmination of the research that the student has done throughout his or her time as an undergraduate and graduate student.

## **THE FIRST YEAR OF THE ACCELERATED MASTER'S PROGRAM**

The AMP program is unique in that it permits students to apply up to 12 units of 500-level course work towards both the Master's and Bachelor's degrees. Hence, the program essentially allows undergraduate students to start on their Master's degree early, before they graduate with their Bachelor's degree. Due to this arrangement, it is imperative that AMP students meet with the HWR Graduate Director as soon as possible upon acceptance to the program in order to review the steps they need to take to progress effectively through the program. Students must understand that a very strict order of courses must be taken in order to be able to complete the AMP in 5 years. As per College of Science requirements, failure to meet deadlines during the AMP will result in the student being ineligible for graduate assistantships.

### **Curriculum**

Students seeking an M.S. degree in Hydrology must complete 30 units of graduate credit. Twelve units of required graduate core course work should be taken during the student's fourth year of study. Students may select from four of the five following core courses:

Fall:	HWRS 517A	Fundamentals of Water Quality	3
	HWRS 518	Fundamentals of Subsurface Hydrology	3
	HWRS 528	Fundamentals of Systems Approach Hydrologic Modeling	3
Spring:	HWRS 519	Fundamentals of Surface Hydrology	3
	HWRS 520	Fundamentals of Water Resource Mgmt, Planning, Rights	3

Undergraduate students may also take HWRS 513A Field Hydrology (2 units) for graduate credit

The following should be taken during the fifth year of study:

- At least 12 additional units of advanced electives. This includes a minimum of 9 units from the primary faculty list in Hydrology & Water Resources at the 500/600 level, and a maximum of 3 elective units of graduate-level classes from the non-HWR list
- Four units of HWRS 910 for research credit.
- One unit of HWRS 695A *Professional Development*
- Students are also required to take a minimum of 1 credit of seminar (HWRS 696-series).

The minimum total of 30 graduate units, including the Master's Thesis/Manuscript and at least 24 regularly graded units of course work, must be completed with a minimum cumulative GPA of 3.000 in order for a student to be granted the Master's degree. In addition, a minimum grade of "B" must be achieved on all core courses in order to be granted the Master's degree.

### **Creating a Master's Committee**

Once accepted to the AMP, the students' first priority is to find a Research Advisor who will guide the student in selecting elective courses and help them put together their draft Plan of Study. The Advisor will also help to select the student's committee and will serve as the student's Master's Committee Chair (if tenure-track) or co-chair (if not tenure track).

### **Next Steps**

All subsequent steps toward the completion of the B.S. part of the AMP are as per the Department of Hydrology & Water Resources. Students should consult with the Environmental Hydrology & Water Resources undergraduate advisor to ensure all requirements for that degree are met.

## THE SECOND YEAR OF THE ACCELERATED MASTER'S PROGRAM

### **Registering for Graduate Courses as a Grad Student**

Once students have been officially accepted by the UA Graduate College as Master's students, they may register for graduate courses using UAccess.

### **Submitting the Plan of Study**

Once a student has been officially accepted to the UA Graduate College, they must complete the Master's Plan of Study. The Plan of Study is essentially a list of courses that a student has taken or is planning to take to complete the Master's degree, including courses that the Master's Committee has approved for elective course work and courses that the Committee has approved for substitution of any core courses. Students must access MyGradColl from the Graduate College site (<http://grad.arizona.edu/>) in order to access the official template for the Master's Plan of Study. Once completed, the student should print out one copy of the plan, have their research advisor sign section 7 and 8b (Major Advisor), sign for the Student Signature line, and submit this to the HWR Graduate Coordinator. The Graduate Coordinator will then obtain Department Head approval (8a), make a copy for the student's files, and then submit the original and necessary copies to the Graduate College's Degree Certification Office.

### **Full-Time Status**

Full-time status as a graduate student is defined in any of the following ways:

Taking 9 units of graduate credit

Taking 6 units and holding a teaching or research assistantship

### **Satisfactory Academic Progress**

In order to remain in good academic standing, students must maintain a cumulative GPA of 3.000 or higher. If a student's cumulative GPA falls below 3.000, then they will be placed on probationary status. If in the following semester, the student is not able to regain a 3.000 or higher GPA, they will be converted to non-degree seeking status by the UA Graduate College. At this point re-admission to the AMP may be possible at the discretion of the HWR department.

### **Finding Funding for the Second Year of the AMP**

In preparation of conversion to graduate status, students may wish to inquire about funding opportunities, as undergraduate scholarships may not be applied towards graduate standing and funding generally not provided for Master's students. AMP students should contact Dr. Martha Whitaker, the HAS Graduate Coordinator for Hydrology at [marthaw@email.arizona.edu](mailto:marthaw@email.arizona.edu) regarding any opportunities for teaching assistantships. In addition, students should talk to their Research Advisors for possible research assistantships.

Should an arrangement be made for students to be a teaching assistant, they must complete the Graduate Assistants in Teaching Orientation (GATO) before teaching, and the Teacher Assistant Training Online (TATO). For more information, please visit <http://grad.arizona.edu/ta>.

### **The Master's Thesis/Manuscript, and Degree Conferral**

As students approach the conclusion of their Master's program, students should meet with their research advisor to discuss the completion of the Master's thesis/manuscript. Students are responsible for making all arrangements for the examination of their manuscript/thesis, including ensuring that a minimum of three weeks is provided so that their committee members can read and assess the manuscript before the due date set by the Graduate College for graduation. The students should bring the Master's Completion

of Degree Requirements form (accessible from the MyGradColl site) to each committee member so that they can fill in the date of the exam, mark "pass" or "fail", and sign the form at the bottom. The student should then submit the form to the HWR Graduate Coordinator before the due date set by the Graduate College. The Graduate Coordinator will complete the remainder of the form, submit it to the department head for approval, and forward it onto the Graduate College. The Graduate College will then update the student's Plan of Study, verify the completion of all course work and requirements, and finally confer the Master's degree.

## **Graduation**

Students are welcome to participate in the College of Science Commencement Ceremony and/or the University of Arizona Commencement Ceremony. Students will be sent information directly from the Dean's Office regarding the College of Science Commencement; students may find information on the University commencement at <http://commencement.arizona.edu/index.html>.

## **CONTACT INFORMATION**

Any questions regarding HWR's Accelerated Master's Program may be directed to:

***Dr. Martha P.L. Whitaker***  
***Assistant Professor of Practice***  
***Undergraduate Academic Advisor, Hydrology***  
***Director of Graduate Studies, Hydrology***  
***Department of Hydrology & Water Resources***  
***JW Harshbarger Building, Room 226A***  
***(520) 621-9715***  
**[mplw@hwr.arizona.edu](mailto:mplw@hwr.arizona.edu)**

**Accelerated Master's Program in Hydrology: Full 5-year plan for BS in EHY and MS in HWR**  
 2012 – 2013 Catalog Year

The plan below is only a sample course schedule and requirements are subject to change and may vary based on catalog year, placement tests, AP/CLEP credit, transfer work, summer school, etc. The official degree requirements are found in the University General Catalog. Students should meet regularly with their academic advisor to discuss their specific course selection and degree requirements.

Course Title	Units	Req.	UD	Notes
<b>SEMESTER 1</b>				
* <sup>2</sup> MATH 125 – Calculus 1	3	F		
CHEM151 – Fundamentals of Chemistry 1	4	Ma		
<sup>1</sup> ENGL101 – First Year Composition 1	3	F		
Tier 1 INDV	3	GE		
<sup>3</sup> Foreign language requirement	4	F		
Total	13-17			
<b>SEMESTER 2</b>				
MATH129 – Calculus 2	3	Ma		
CHEM152 – Fundamentals of Chemistry 2	4	Ma		
PHYS141 – Introduction to Mechanics	4	Ma		
ENGL102 – First Year Composition 2	3	F		
Tier 1 INDV		GE		
Total	17			
<b>SEMESTER 3</b>				
MATH223 – Vector Calculus	4	Ma		
HWR5250 – Principles of Hydrology	3	Ma		
PHYS143 – IntroOptics-Thermodynamics	2	Ma		
Tier 1 TRAD	3	GE		
GEOS251-Physical Geology	4	Ma		
Total	17			
<b>SEMESTER 4</b>				
*C E 218 – Mechanics of Fluids	3	Ma		
MATH254 – Intro Ordinary Diff. Equations	3	Ma		
ECOL130 – Natural History Southwest	3	Ma		
**GEOS304 – Struct+Phys [or GEOS302]	4	Ma		
Tier 1 TRAD	3	GE		
Total	16			
<b>SEMESTER 5</b>				
HWR5431 – Hydrogeology	4	Ma		
SIE 305 – Intro Engr Probability & Stats	3	Ma		
* <sup>6</sup> CE 427 – Comp App Hydraulics	3	Ma		
**Tier 2 INDV	3	GE		
<sup>5</sup> Comp elective – Computational elective	3	Ma		
Total <i>* application to AMP due 1 December</i> <i>* notification by 31 December</i>	16			
<b>SEMESTER 6</b>				
<sup>4</sup> Tech Elective	3	Ma		
ATMO436A – Fund. of Atmo. Sciences	3	Ma		
*SWES408 - Sci Writing for Envir+Ag+Lf Sci	3	Ma		
**HWR5415 – Intro Water Resource Policy	3	Ma		
CE 423 – Hydrology	3	Ma		
HWR513A – Field Hydrology***	2	GR		
Total	17			



				enroll as 413A otherwise.
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Course Title	Units	Req.	UD	Notes
<b>SEMESTER 7</b>				
HWRS443A – Envir. Risk+Econ Analysis WR	3	Ma		
HWRS517A – Fund. of Water Quality	3	GC		
*HWRS498 – Senior Capstone Course	3	Ma		
<sup>4</sup> Tech/Gen = WR 518 – Fundamentals of Subsurface Hydrology	3	GC		
<sup>6</sup> RNRxxx – GIS-related course	3	Ma		
Total	15			
<b>SEMESTER 8</b>				
**Tier 2 ARTS/HUM [or HWR415 if T2 ARTS/HUM was taken in junior year]	3	GE		
HWRS449 – Statistical Hydrology	3	Ma		
<sup>6</sup> HWRS482- ApplGroundwater Modeling [or emphasis area elective]	3	Ma		
SWES470 – Soil Physics	3	Ma		
<sup>4</sup> Tech/Gen = HWRS 519 Fund. Surface Hydro OR HWRS 520 Fund. Water Res. Mgt.	3	GC		
*HWRS498- Senior Capstone Course	1	Ma		
Total				
GRAND TOTALS	16			<i>* Bachelor's degree awarded at end of this semester; formal application to Grad College</i>

Course Title	Units	Req.	UD	Notes
<b>SEMESTER 9</b>				
HWRS 528 Fund. Systems Approach to Hydrologic Modeling OR take HWRS 519 or 520 in Semester 10	3	GC		
Select from Primary Faculty List (9 units minimum) OR from pre-approved non-HWR list (3 units maximum)	3	GR		
HWRS 695A –Professional Development	1	GR		
HWRS 910 Research/Thesis units	2	GR		
Total	9			
<b>SEMESTER 10</b>				
Select from Primary Faculty List (9 units minimum) OR from pre-approved non-HWR list (3 units maximum)	6	GR		
HWRS 910 Research/Thesis units	2	GR		
HWRS 696 seminar series	1	GR		
Total	9			

## Key

**GC** = Graduate Core Course

**GR** = Graduate Requirement

**Ma** = BS Major Requirement

**GE** = General Education Requirement

**F** = Foundation Requirement

**E** = Elective

**H** = Honors Course

## University Requirements for BS in EHY

128 units; 42 units must be upper-division (300-499)

Minimum 2.0 cumulative GPA; Minimum 2.0 major GPA

30 total UA units; 18 of the final 30 units must be in residence

## Foundations

<sup>1</sup> English Composition requirement satisfied with either English 101 *and* 102 or English 109 or English 107 and 108

<sup>2</sup> Math requirement (*This degree requires MATH 124 or 125, 129, 223, 254*)

<sup>3</sup> Second language proficiency (*Foreign language at the second semester is required for the degree*)

## General Education Requirements

### Tier I

2 courses in Traditions & Cultures without repeating the "A", "B", "C" or "D" designation in the course numbers

2 courses in Individuals & Society without repeating the "A", "B", or "C" designation in the course numbers

NATS requirements are satisfied within this major, no NATS are necessary for this degree.

### Tier II

Arts (3 units from approved list)

Individuals and Societies (1 course from approved list)

Humanities (1 course from approved list)

Natural Science (1 course from approved list)

Diversity Emphasis (1 course from approved list, can be taken as T1 or T2 if available)

Gender, Race, Class, Ethnicity, Sexual Orientation, or Non-Western Area Studies; certain Tier I and Tier II courses meet this requirement.

Honors College students: for information about the Honors General Education option which allows greater flexibility in fulfilling the three study areas of Traditions and Cultures, Individuals and Societies, and Natural Sciences, see:

<http://www.honors.arizona.edu/HonorsAcademics/Policies/GenEd.htm>

## Major Requirements

<sup>4</sup>Tech/General electives continued- Tech and Tech/Gen courses may not be pre-requisite to or equivalent to any required course.

Students who wish to emphasize Surface Water, Groundwater, Water Quality, or Water Resources should take 2 courses in one of the following areas (use as technical electives):

### Emphasis areas:

- Technical Electives in Surface Water- CE 427, WSM 467, RNR 417, CE 214, CE 323 (CE 214 and 323 are exceptions to the pre-requisite/equivalent rule)
- Technical Electives in Groundwater- HWRS 482, GEOS 302, GEOW elective, or HWRS 505 or 518 for advanced students who meet eligibility requirements.
- Technical Electives in Water Quality- CHEM 241a, MIC 205 A&L after taking MCB 181R in lieu of ECOL 206, WSM 468, CHEM 323.
- Technical Electives in Water Resources- AREC 375, HWRS 481, SWES 444, SWES 415, SWES 454, GEOG 455

Additional emphasis Area electives in these categories are available. With advisor approval, up to 2 additional courses may substitute for HWR major electives. Substitution for HWR electives can only occur if both Technical Electives are selected from one of the recommended areas of emphasis. A student may develop a more specialized plan of study for one of these areas of emphasis: General Hydrology, Surface Water, Groundwater, Water Quality, and Water Resources. Contact an advisor for sample plans of study.

<sup>6</sup>HWR Major Electives (Advanced Courses in HWR): AMP students must take HWRS 498 Senior Capstone HWRS 498 *Senior Capstone*. The instructor must approve the Senior Capstone topic at least one semester prior to enrollment: Honors students may complete an approved Senior Honors Thesis in Lieu of the Senior Capstone course. Then select 2 more out of 4:

1. HWRS 482 *Applied Groundwater Modeling*
2. GEOS 450 *Geomorphology*
3. HWRS 427 *Comp Appl. Hydraulics*, or WSM 467
4. One GIS course: RNR 403 or RNR 417 or RNR 419, or RNR 420. Consult Catalog and Schedule of Classes for semester of offering!