

*July 2011*  
*AQUACULTURE/FISHERIES*  
*MASTER OF SCIENCE DEGREE PROGRAM*



*School of Agriculture, Fisheries and Human Sciences*  
*University of Arkansas at Pine Bluff*

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The policies and guidelines listed in this handbook require continuing evaluation, review and approval by the department and the university administration. The procedures in this handbook reflect the policies at the time of printing and the department and the university reserve the right to change the policies at any time without prior notice. It is the responsibility of each student to become familiar with these guidelines and to become aware of changes as they occur.

## OVERVIEW OF AQUACULTURE/FISHERIES CENTER

The Aquaculture/Fisheries Center at the University of Arkansas at Pine Bluff (UAPB) was created in 1988. It combines resident instruction, research and extension responsibilities into one comprehensive unit. Currently, the Center has a total of 47 faculty and staff including 16 Ph.D. scientists, 15 M.S., 10 B.S.-level staff and 4 secretarial and maintenance personnel.

The research component of the Aquaculture/Fisheries Center is supported by a 113-pond earthen pond facility that also includes a 40-pool unit. The 5,400 sq. ft. hatchery houses holding, spawning, and experimental tanks along with a small recirculating culture system. Additional buildings provide storage areas for feed, chemicals, tools and seines. A research and demonstration building for value-added product development provides opportunities to measure dressout yield of fish in production studies and develop new value-added products from aquaculture. The S. J. Parker Agricultural Research Center building provides laboratory space that includes a 1,300 sq. ft. wet laboratory for aquarium studies, a water quality laboratory, and a 1,000 sq. ft. nutrition laboratory. The 1890 Extension building houses the state-of-the-art fish health diagnostics laboratory that is fully equipped to conduct microbiological, viral, and histopathological analyses of fish. The Aquaculture Equipment Development Building provides facilities for equipment, research, and development. The Hatchery Development and Research Building was completed in 2005 for hatchery fish and water quality. It is divided into two dry labs and two wet labs that can be combined or separated with independent temperature/light control. The Fish Shop, the Applied Sciences Building, and the Boat Storage Facility provides approximately 7,000 sq. ft. of laboratory, wet-lab, offices, and equipment storage for natural fisheries research. This research program has available 3 electrofishing boats, 3 backpack shockers, 4 aluminum boats ranging in size from 14 to 18 ft., outboard motors from 7.5 hp to 40 hp, a state of the art fish aging laboratory, and additional equipment (standard nets, seines, trawls, and traps) and supplies necessary to support recreational fisheries research needs of Arkansas' Delta Region.

Aquaculture research conducted at UAPB focuses primarily on pond and hatchery production technologies, fish nutrition, water quality, fish health, and economics and marketing of aquaculture products. Much of the work is devoted to catfish and bait minnows. UAPB aquaculture researchers have developed new fish spawning and hatching technologies that dramatically improve hatch rates and survival, lower production costs, and reduces groundwater usage. The UAPB fish nutrition program has developed new feed formulations that lower costs of production and improve growth and feed conversion. New catfish farming equipment developed and patented at UAPB reduces harvesting labor, removes undersized fish from harvesting nets and effectively sorts other species from catfish. UAPB research develops guidelines that help farmers select the most efficient and profitable management strategies.

Water quality research has focused on the effects of filter-feeding fish in catfish ponds and the effects of aerial applications of common herbicides on pond plankton populations and water quality.

UAPB natural fisheries research is focused on improving recreational fishing in Arkansas' Delta Region (Mississippi River alluvial plain). Research includes: evaluating stocking success of largemouth bass and crappie in rivers, oxbow lakes, and reservoirs; identification of appropriate species, impacts of stocking programs, and management options in farm pond; program evaluations of community fishing programs; and studies that are designed to gain a better understanding of floodplain river ecosystem function and its importance for maintaining and enhancing fisheries resources.

Aquaculture Extension programming in Arkansas is administered through the Aquaculture/Fisheries Center at UAPB. Seven Extension Fisheries Specialists, and three Extension Associates are located in Lonoke, Pine Bluff, Lake Village, and Newport, Arkansas, to provide assistance to the aquaculture industry. Disease and water quality diagnostic support is provided through four laboratories in Lonoke, Lake Village, and Newport, Arkansas, and the 1200 sq. ft. diagnostics laboratory on the UAPB campus. Extension efforts have included intensive in-service training of county agents in catfish production, producer workshops, problem solving, publication of the quarterly newsletter Arkansas Aquafarming, bilingual farm labor training, farm demonstrations, an innovative Catfish Research Verification Program, farm pond management, and a Fish Farm Safety Program.

The aquaculture industry in Arkansas supports the Aquaculture/Fisheries Center with financial support, in-kind contributions and through participation in the National Fisheries Advisory Council to the Center. The Advisory Council provides overall guidance in terms of research priorities.

The NAA (National Aquaculture Association) moved its office to the UAPB campus in 2008.

The Department of Aquaculture and Fisheries offers post-baccalaureate training for careers in aquaculture (applied fisheries, fish farming and related support industries) and natural fisheries (fisheries science, fish population management and related support areas of study). The course work includes 23 graduate lecture courses, Graduate Seminar, Graduate Research Problems, Special Topics, and Research and Thesis. Offering both aquaculture and fisheries science specializations provides an opportunity for a broader degree program that fits the needs of the state of Arkansas and our students

#### ADMISSION PROCESS

Prospective students must submit a complete set of application materials to the Department of Aquaculture and Fisheries. All correspondence regarding admission should be directed to the Aquaculture and Fisheries Graduate Coordinator. The set of application materials includes:

1. Application for Admission to the Aquaculture/Fisheries Degree Program (Form # 01).

2. Application for Admission (Form #00).
3. Three letters of recommendation (Form # 02).
4. Official transcripts from all schools attended beyond high school.
5. Official GRE scores.
6. Copy of Immunization Records, including MMR. International applicants also need TB test results and a second MMR immunization.
7. Non-refundable application fee of \$37 (checks should be made out to the University of Arkansas at Pine Bluff).

International students will also need to submit:

8. Official TOEFL paper score of 550 (213 on computer version, 79 on the internet version) or 6.5 on the IELTS (International students). International applicants who hold degrees or diplomas in a related subject from post-secondary institutions in English-speaking countries (e.g. the United States, Canada, England, Ireland, Australia, New Zealand) or who have successfully completed at least a two year post-secondary course of study in which English was the language of instruction are not required to submit TOEFL or IELTS scores.
9. Financial Statement for Prospective International students (form 18). Please note that the form states \$17000, but for students with assistantships \$5000 must be shown by bank statement.
10. Affidavit of Support (form 16).
11. I-34, Affidavit of Support (form 17).

The applications for admission and the recommendation forms are available on the departmental web site [www.uaex.edu/aqfi/grad/](http://www.uaex.edu/aqfi/grad/).

#### APPLICATION DEADLINES

Application deadlines for admission to the Master of Science degree program are: June 20 for Fall Semester, November 10 for Spring Semester, and March 10 for Summer Session I.

Application deadlines for international students are: June 1 for the Fall Semester and October 1 for Spring Semester, April 1 for the Summer Session.

#### ADMISSION REQUIREMENTS AND STUDENT CLASSIFICATION

No student will be admitted under any condition unless a faculty member agrees to serve as the student's advisor. During the application process, the applicant indicates a preferred area of specialization that is referred to the appropriate faculty member for review. This requirement ensures that adequate research facilities and funding will be available upon admission for the student's thesis work.

##### 1. Regular Admission

To be admitted as a regular student, applicants must have earned a baccalaureate degree in a natural science field from an accredited institution and have scored above 550 on the TOEFL paper version (213 on the computer version, 79 on the internet version), or 6.5 on IELTS (for international students, if applicable). Applicants must have scored at least 900 on the GRE (Quantitative & Verbal) with a grade point average during the Junior and Senior years of 3.5 or better, or have scored at least 1000 on the GRE with a grade point average during the Junior and

Senior years of 3.0 or better.

## 2. Provisional Admission

Applicants who meet the GRE and grade point average requirements but have a baccalaureate degree from an accredited institution in a non-natural science field may be accepted as a provisional student. Provisional students must make up deficiencies through undergraduate course work that will not count for credit toward a degree. The specific course work will be determined by the graduate coordinator, the student's advisor, and the department chair.

## 3. Conditional Admission

Students with a baccalaureate degree in a natural science field from an accredited institution who do not meet the GRE and/or grade point average requirements may be accepted as a conditional student. Conditional acceptance is granted only at the chair's discretion and is usually reserved for individuals with extensive work experience in the field. Conditional students must earn a GPA of 3.0 or better during their first semester to continue in the program.

## FEES (effective 8/2011)

### 1. Tuition

In-state tuition is \$170 per credit hour and out-of-state tuition is \$391 per credit hour. Graduate students on assistantships are charged in-state tuition. Students are responsible for all fees.

### 2. Other Fees

Facility Fee	\$14.00/credit
Athletic Fee	\$15.00/credit
Technology Fee	\$8.25/credit
Transit Fee	\$1.50/credit
Health Services Fee	\$48.00/regular semester
Health Services Fee	\$14.50/summer session
Student Activity Fee	\$48.00/regular semester
Student Activity Fee	\$24.00/regular semester (less than 12 hours)
Student Activity Fee	\$6.65/summer session
Matriculation Fee (first time students)	\$37.00
Change of Schedule fee (per class)	\$15.00
Late Registration Fee	\$34.50
Laboratory Fee (per lab)	\$35.00
Transcript Fee	\$4.00
Graduation Fee	\$55.00
International Students Fee (international only)	\$50.00/regular semester
International Students Fee	“ \$25.00/summer session

## GRADUATE RESEARCH ASSISTANTSHIPS

Research assistantships are awarded for a maximum of 2.5 years. Research assistantships are funded through research grants to individual faculty members and funding possibilities should be

discussed with prospective advisors.

The assistantship for first-year graduate students is \$17,800 per annum and for second-year graduate students is \$18,800 per annum. Students receiving assistantships are expected to work 20 hours per week and to be enrolled as a full-time student. Students are responsible for all tuition and fee payments. The first-year assistantship breakdown is tuition and fees (\$3,300), health insurance (\$500) and stipend (\$14,000). In addition, international students are required to use international health insurance (\$590/yr) and to submit the International Students Fee (\$50/semester regular and \$25/semester summer sessions).

#### TRANSFER OF CREDIT

Subject to the approval of the student's advisor, the graduate coordinator, and the department chair, a student may transfer up to 8 semester hours of credit from graduate courses taken elsewhere with a "B" grade or above (Form #03) toward the M.S. at UAPB.

While in the M.S. program at UAPB, requests for course work to be taken at another institution for transfer must have the advance approval of the student's advisor, the graduate coordinator, and the department chair. Only course work with "B" or better grades earned at an accredited graduate school and acceptable toward a graduate degree at that institution will be considered for transfer.

#### ENROLLMENT IN GRADUATE CLASSES

Undergraduate students and students who have not been admitted to the Aquaculture/Fisheries Master of Science degree program may enroll in graduate courses only with approval of the department chair and course instructor. Graduate courses may not be used simultaneously to fill both undergraduate and graduate course requirements.

#### GRADUATE STUDENT LOAD

A full-time graduate student load is 6 credit hours during a regular semester and 2 credit hours during the summer term. A full-time graduate student's load may not exceed 15 credit hours per regular semester, including any undergraduate courses. A full-time student's load may not exceed 8 credit hours during the summer term. Students who wish to enroll in a course at another campus must file a concurrent enrollment form, signed by their major advisor, graduate coordinator, department chair and dean, with the Registrar prior to enrolling on another campus. There is a separate concurrent enrollment form to be filed by international students with the Office of International Studies. Students who are not enrolled full-time are not eligible for graduate assistantships. Students not on assistantships and finishing their thesis may maintain graduate status with 1 credit. International students will need to contact the Office of International Studies for a course reduction form and will need a letter from their advisor to maintain graduate status with 1 credit.

#### AUDITING COURSES

Students registering for "Audit" must indicate during the registration period. The symbol to use for a course being audited is "AUD". Auditors pay the regular student fee (no academic credit is

awarded). Students seeking to audit a graduate course must obtain permission from the course instructor.

### ADVISORY COMMITTEE

A student's advisor must be a faculty member of the Department of Aquaculture and Fisheries. During a student's first semester an advisory committee must be assembled (Form #04). This is the responsibility of both the student and the advisor. Failure to complete this requirement will result in receiving an "F" in Graduate Seminar GAQF 5195-5196. The advisory committee should consist of three to five members including the advisor. Faculty from the Department of Aquaculture and Fisheries must compose a majority of the committee members and must have UAPB graduate faculty status. UAPB faculty from other departments must also have UAPB graduate status to serve on thesis committees. Students are encouraged to seek professionals from outside of the department to serve on their committee. These professionals are not required to have UAPB Graduate Faculty status. The graduate coordinator will maintain a list of possible external committee members. External committee members should submit a CV or resume and receive approval from the advisor, graduate coordinator, and the department chair before serving on an advisory committee. Switching advisors is allowed during the first two years of study with permission of the current advisor, the prospective advisor, the graduate coordinator, and the department chair (Form #05). Changes in a committee member (Form #06) must be approved by the student's advisory committee, the graduate coordinator, and the department chair. All original forms must be filed with the graduate coordinator. Copies will be forwarded to the registrar's office by the graduate coordinator.

### PROGRAM OF STUDY

A program of study must be finalized by the end of the first semester of graduate course work in a committee meeting (Form #7). This meeting should be arranged by the student and attended by the advisor, all committee members, and the graduate coordinator and/or the department chair. Conference call arrangements should be made for committee members unable to attend the meeting. The advisory committee, the graduate coordinator, and the department chair must sign programs of study. The program of study includes courses to be taken by semester over the generally 2.5 year period of enrollment. Coursework must include a minimum of 34 credit hours. At least 26 credit hours must be core courses, including Research Methods and Scientific Writing, and one graduate level course in statistics. In addition to the 26 credit hours of core courses, 2 credit hours of Graduate Seminar are required. One credit hour of Graduate Seminar must be taken in the first semester of study. A student's committee may require further course work. Failure to complete this requirement by the end of the first semester will result in receiving an "F" in Graduate Seminar GAQF 5195. Changes in the program of study (Form #8) must be approved by the student's advisory committee, the graduate coordinator, and the department chair. All original forms must be filed with the graduate coordinator to be forwarded to the registrar's office, with copies kept on file by the graduate coordinator.

### COMMITTEE MEETINGS

Committee meetings are essential to a successful and positive graduate student experience. This format brings members of the students support team together to exchange ideas, work through

research problems and changes, and monitor the student's academic and research progress. Students are required to have a program of study committee meeting their first semester.

Students are strongly encouraged to schedule additional committee meetings during their tenure in the department.

**THESIS PROPOSAL AND PROPOSAL DEFENSE**

Students will prepare a thesis concerning original research during their tenure in the Master of Science degree program. A thesis proposal should be presented and defended in a seminar prior to the initiation of thesis research and must be completed and approved by all committee members within the first 200 days in the program. The deadlines are as follows:

Date of Entry in Program	Deadline for Submitting Completed & Approved Proposal Defense Forms
Spring	July 31 <sup>st</sup>
Summer I	December 15 <sup>th</sup>
Summer II	January 31 <sup>st</sup>
Fall	March 15 <sup>th</sup>

At least one week's notice to all faculty, staff and students is required. The defense should be scheduled in a major auditorium. The committee will meet immediately following the defense to discuss any further changes in the proposal. **Failure to complete the thesis proposal, (i.e., public presentation and defense of proposal, and submission of approved thesis proposal by all committee members) by the above deadlines will result in termination of the assistantship. Upon completion of the thesis proposal, proposal defense, and submission of the proposal with signatures of committee members the assistantship will be resumed.** Lost income will not be returned and the student is not eligible for employment in the department during this time period. The proposal must include an Introduction, Literature Review, Methods, and Citations section. The style of the thesis proposal will follow the "manuscript preparation" guidelines for American Fisheries Society or World Aquaculture Society journals (see PREPARATION OF THE THESIS below). The advisory committee, the graduate coordinator, and the department chair must sign the thesis proposal. The original must be filed in the department office with the graduate coordinator.

**GRADUATE COURSE OFFERINGS**

**GAQF 5210 Advanced Aquaculture 3 Credits (3 hrs. Lecture)**

Students will learn the biological, chemical, and physical bases, determinants and limitations of production systems and major species. Climatic influences will be discussed. Special consideration will be given to species of regional importance and elements of hatchery management and fish genetics. This course is needed by all aquaculturists. Offered spring semester of odd years.

**Prerequisites: None**

**GAQF 5322 Aquaculture Economics 3 Credits (3 hrs. Lecture)**

Aquaculturists need to be able to develop, interpret, and use results of economics and financial analyses to improve economic and financial performance of aquaculture businesses. The course will cover the application of economics, and financial analysis techniques in aquaculture. Enterprise budgets, balance sheets, income statements, cash flow budgets, loan management, risk analysis, business plan development and whole-farm modeling are included. No prior background in economics and marketing is required. Offered fall semester of odd years.

**Prerequisites: None**

**GAQF 5323 Aquaculture Marketing 3 Credits (3 hrs. Lecture)**

Aquaculturists need to understand how to develop a marketing plan and interpret results from marketing research. This course will cover key marketing concepts, functions, channels, and strategies. Examples will be focused on the aquaculture industry. No prior background in economics and marketing is required. Offered fall semester of even years.

**Prerequisites: None**

**GAQF 5324 Quantitative Methods in Fisheries and Aquaculture Economics 3 Credits (3 hrs. Lecture)**

This course will introduce students to quantitative methods used to: 1) identify consumer preferences; 2) estimate demand for either an aquaculture product or a non-market good or service; 3) willingness-to-pay techniques; 4) contingent valuation; 5) logit analysis; and hedonic analyses. Offered spring semester of odd years.

**Prerequisites: Aquaculture Economics (5322) or Aquaculture Marketing (5323)**

**GAQF 5336 Aquatic Animal Nutrition 3 Credits (3 hrs. Lecture)**

This course covers metabolism and nutritional requirements of fishes and other aquatic animals. Biochemical concepts of nutrient utilization will be discussed. Emphasis is on the differences between nutrient use and requirements of aquatic animals versus terrestrial ones. This course is needed by aquaculture students. Offered fall semester every year.

**Prerequisites: None**

**GAQF 5136 Aquatic Animal Nutrition 1 Credit (3 hrs. Lab)**

This course covers laboratory analytical procedures relevant to fish nutrition studies (protein, lipid, dry matter, ash, etc.). Students will also initiate and maintain a group project (usually a feeding trial) to gain practical experience in methods used to determine nutrient requirements or optimal feeding strategies for different fish species. Offered fall semester every year.

**Prerequisites: None**

**GAQF 5414 Ecology of Fishes 4 Credits (3 hrs. Lecture, 3 hrs. Lab)**

Students will learn the fundamental concepts of ecology. Students will learn specific life history requisites of native Arkansas fishes and how they interrelate with habitat parameters. Students will also be introduced to simplistic habitat modeling techniques. This course is recommended for students with the goal of working in natural resource management or research. Students should have taken a course in ichthyology that emphasized taxonomy of fishes. Offered spring semester of even years.

**Prerequisites: None**

**GAQF 5220 Engineering and Construction of Aquaculture Facilities I 2 Credits (3 hrs. Lecture, 3 hrs. Lab)**

This course will cover site selection and construction of levee and watershed ponds, repairing levees and ponds, cage construction and placement, in-pond raceways, aeration, and pond effluents. Strongly recommended for all aquaculture students. Offered summer semester I of odd years.

**Prerequisites: None**

**GAQF 5221 Engineering and Construction of Aquaculture Facilities II 2 Credits (3 hrs. Lecture, 3 hrs. Lab)**

This course will cover degassing mats, pumps, open channel and piping systems, transportation, and management, and components of recirculating aquaculture systems with fish only and with fish integrated with plant production. Offered summer semester II of odd years.

**Prerequisites: None**

**GAQF 5430 Fish Health Protection 4 Credits (3 hrs. Lecture, 3 hrs. Lab)**

Fish diseases are a major factor governing the management of natural fisheries and diseases also have a significant impact on commercial aquaculture. In this class, students will learn disease diagnostic techniques from microscopy to PCR, survey the major diseases of wild and cultured fish, and learn about the relationships between fish disease and regulatory actions. Additional lectures will cover shrimp and shellfish diseases. The laboratory portion of the course is conducted in the UAPB Fish Disease Diagnostic Laboratory and requires students to diagnose, document, and report on fish disease cases. Offered spring semester of even years.

**Prerequisites: None**

**GAQF 5325 Fish Population Dynamics 3 Credits (3 hrs. Lecture)**

Students will learn theoretical aspects of population dynamics and the interaction of natality, mortality, growth, and exploitation of fish populations in order to model and manage them. Offered fall semester of even years.

**Prerequisites: None**

**GAQF 5371 Fisheries Management 3 Credits (3 hrs. Lecture)**

Students will learn about fish population in streams, reservoirs, lakes and oceans and will also learn techniques and methods to assess and manage these populations. This course is needed by all fisheries biologists. Offered spring semester of odd years.

**Prerequisites: None**

**GAQF 5435 Management of Small Impoundments 4 Credits (3 hrs. Lecture, 3 hrs. Lab)**

Students will learn the principles that govern the management of small impoundments for recreational fishing. Students will learn about species balance, population balance, field techniques to assess balance, and methods to correct unbalanced populations. Labs will be field trips to ponds in Jefferson and adjacent counties to assess the balance of farm ponds; to make

recommendations about their balance; and to formulate solutions to unbalanced populations. This course is needed by extension biologists, aquaculturists, and research biologists. Offered spring semester of even years.

**Prerequisites: None**

**GAQF 5300 Research Methods and Scientific Writing 3 Credits (3 hrs. Lecture)**

The two main objectives of this course are: 1) to familiarize students with planning and execution of scientific experiments and 2) to enable students to convey research results effectively through written communications. Students will learn general principles of scientific writing and how to conduct literature searches. Different formats of written communications pertinent to aquaculturists and fisheries biologists will be examined (e.g. peer-reviewed journal articles, extension and trade publications, government documents). Offered spring semester of every year.

**Prerequisites: None**

**GAQF 5405 Statistics in Research 4 Credits (3 hrs. Lecture, 2 hrs. Lab)**

This course will cover the fundamentals of basic statistics and analytical techniques that are needed for scientific research data analysis. The statistics taught in this class will range from descriptive statistics, simple t-test, ANOVAs, to linear regression. Theories and applications of statistics will be dealt with real-world examples. Offered fall semester of every year.

**Prerequisites: College Algebra**

**GAQF 5406 Univariate and Multivariate Models in Fisheries Science 4 Credits (3 hrs. Lecture, 3 hrs. Lab)**

This course will cover models that are developed to deal with univariate and multivariate data analysis. The statistical modeling techniques taught in this class include multiple regressions, model selection methods, logistic regressions, multivariate ANOVAs, ordinations, and classification analyses. Theories and application to real-world examples will be used to understand the statistical methods. The laboratory session will focus on the application of the models for specific uses. Offered spring semester of even years.

**Prerequisites: Statistics in Research (5405)**

**GAQF 5407 Experimental Design and Analysis 4 Credits (3 hrs. Lecture, 3 hrs. Lab)**

The success of research studies starts with the research design. This course addresses the needs of graduate students preparing for a career in agricultural and aquaculture research as professional scientists in the subject areas of experimental design, plot layout, analysis and interpretation of laboratory and field experiments. Many numerical examples and problems will be presented, and the recitation through homework assignments will allow students to explore their analyses. Laboratories will be devoted to practical applications and exercises. Offered spring semester of odd years.

**Prerequisites: Statistics in Research (5405)**

**GAQF 5208 Nonparametric Methods in Data Analysis 2 Credits (2 hrs. Lecture)**

Parametric statistics, such as t-test and F-tests, require very rigorous parametric assumptions

about the underlying distribution of populations. However, we often deal with data that do not satisfy the restrictive parametric assumptions of sufficient sample size that are crucial for accurate and unbiased statistical inferences. This course will introduce alternative nonparametric statistical methods that can be used in the analysis of data that do not meet parametric statistical assumptions. Offered summer session II of even years.

**Prerequisites: None, Statistics in Research (5405) recommended**

**GAQF 5420 Fish Physiology 4 Credits (3 hrs. Lecture, 2 hrs. Lab)**

This course will impart an understanding of the organization of diverse physiological systems. The course begins with energy mobilization and systems responsible for the maintenance of homeostasis; followed by integration of and response to environmental signals through sensory biology and the neuroendocrine systems; and concludes with applications of fish physiology to fisheries management and aquaculture. Offered fall semester of odd years.

**Prerequisites: None.**

**GAQF 5445 Stream Ecology 4 Credits (3 hrs. Lecture, 3 hrs. Lab)**

Students will learn about the chemical, physical and biotic factors that affect stream organisms and will also learn how aquatic ecosystems function. Stream organisms have developed adaptations to cope with such systems. Stream habitat management, impact assessment, and habitat modeling will be emphasized. Hydrologic data interpretation will be integrated into field exercises. This course is recommended to acquire an understanding of stream hydrology and dynamics and is necessary for students who embark on careers with regulatory or management functions. Offered fall semester of odd years.

**Prerequisites: None**

**GAQF 5440 Aquatic Chemistry and Analysis 4 Credits (3 hrs. Lecture, 3 hrs. Lab)**

The physical, chemical, biological, and hydrological characteristics of surface water systems will be reviewed. Specific attention will be given to procedures that evaluate interactions among water, soils, and biota that provides the driving forces behind overall productivity of aquatic systems and carrying capacity of pond aquaculture facilities. This course will be useful to all aquaculture and fisheries scientists. Offered fall semester of even years.

**Prerequisites: None**

**GAQF 5341 Water Quality Management 3 Credits (3 hrs. Lecture)**

This course covers the management of water quality in commercial fish ponds, farm ponds, impoundments and streams. Students will apply water chemistry to management goals for various water bodies. This course is useful to all aquaculture and fisheries scientists. Offered spring semester of odd years.

**Prerequisites: Aquatic Chemistry and Analysis (5440)**

**GAQF 5310 Program Evaluation and Survey Methods 3 Credits (3 hrs. Lecture)**

This course will cover the fundamentals of program evaluation and survey methodologies. Evaluation models such as systems analysis, behavioral objectives, and goal-free will be studied. The construction, design, and implementation of questionnaires using a sound scientific approach

will be covered in depth. Offered spring semester of even years.

**Prerequisites: None**

**GAQF 5315 Extension Methodology 3 Credits (3 hrs. Lecture)**

This course will cover the history and mission of the land-grant system with particular emphasis on Extension. Extension community needs assessment, program development, implementation, and evaluation will be covered. Extension methodologies for technology transfer will be covered in depth. Strongly recommended for all students. Offered summer of even years.

**Prerequisites: None**

**GAQF 5390 Special Topics (3 credit hours)**

**GAQF 5391 Special Topics (3 credit hours)**

This course is offered as a forum to cover timely and topical issues that affect aquaculture and fisheries as they arise. Examples of such issues include aquatic vegetation, regulatory issues, processing and food technology.

**GAQF 5195 Graduate Seminar (1 credit hour)**

**GAQF 5196 Graduate Seminar (1 credit hour)**

Seminars will be presented each week by faculty, staff, students, and guest lecturers. Approaches will include recent perspective and historical overviews as well as critiques of recent research in applied and natural fisheries. First semester graduate students must take GAQF 5195. Course requirements for GAQF 5195 include having a committee meeting where the student's advisory committee develops a program of study. Offered spring and fall semesters of every year.

**GAQF 5198 Graduate Research Problems (1 credit hour)**

**GAQF 5298 Graduate Research Problems (2 credit hours)**

**GAQF 5398 Graduate Research Problems (3 credit hours)**

This project-oriented course offers advanced studies in aquaculture and fisheries. The course provides the opportunity for students to obtain specialized skills or undertake research in areas outside the scope of the student's thesis research. Class activities would be arranged in advance with instructors amenable to supervising this course. The amount of credit offered for this course will vary from 1-3 credit hours and depend upon the scope of the project. Credit offered for the course and scope of the project would be determined prior to registration. A research problems outline approved by the course supervisor, graduate committee, and graduate coordinator must be submitted with the program of study (Form #12).

**GAQF 5129- 5159, 5192, 5199 Research and Thesis (1 credit hour)**

**GAQF 5292 – 5294, 5299 Research and Thesis (2 credit hour)**

**GAQF 5392 – 5394, 5399 Research and Thesis (3 credit hours)**

**GAQF 5499 Research and Thesis (4 credit hours)**

**GAQF 5599 Research and Thesis (5 credit hours)**

**GAQF 5699 Research and Thesis (6 credit hours)**

**GAQF 5799 Research and Thesis (7 credit hours)**

**GAQF 5899 Research and Thesis (8 credit hours)**

## **GAQF 5999 Research and Thesis (9 credit hours)**

### **GRADES**

The letters A, B, C, D, F, I, P, and W are used in grading, indicating the following qualities: A-Excellent, B-Good, C-Fair, and D-Failure, I-Incomplete, P-Pass, and W-Withdrawal. Except in the case of Thesis Research an incomplete grade not removed within one semester will be recorded as "F". A summer session counts as a semester.

A student who drops an individual course will receive a grade of W in the course. The final date for dropping individual courses is listed in the course schedule booklet each semester. It is usually the end of the eighth week of classes. A student withdrawing from a course must have the written permission of the advisor and the department chair.

For the purpose of computing cumulative grade point averages, grade points are assigned as follows: A-4, B-3, C-2, D-1, F-0. A student's grade point average is computed by multiplying the number of hours of credit of each grade by the grade points assigned to that grade and dividing the sum of these products by the total number of hours in which the student was enrolled.

### **ACADEMIC PROGRESS, PROBATION AND DISMISSAL**

A cumulative grade point average of 3.0 or better on a 4 point scale must be maintained during the student's academic career. If a student's GPA falls below a 3.0 they are placed on academic probation during the following semester. If at the end of their probationary semester, the student's GPA is still below a 3.0 they will be dismissed from the Master of Science degree program. The dismissal may be appealed to the advisory committee, graduate coordinator and the department chair.

### **DISPUTED GRADES**

A student's grade should represent the instructor's good faith judgement of the student's performance in the course based on the informed use of appropriate measurement and evaluation instruments. If a student disagrees with a grade he/she has received, the following procedure should be followed until the problem is resolved. These steps must be followed in order and appropriate documentation of each step (including notation of the date, time, location, length, content and final outcome of the discussion) must be provided in order to proceed to the next step.

1. The student should discuss the disputed grade with the instructor of the course. This should normally take place during the instructor's posted office hours.
2. If the dispute is not resolved in step one, the student should request a meeting with the chairperson of the department offering the course. The instructor of the course will also attend this meeting.

### **COMPREHENSIVE EXAMINATIONS**

Students must pass a comprehensive examination prior to defense of their thesis. The comprehensive examination will test a student's overall competence and ability to think critically and synthesize information. The examination will include written and oral components. The

student's graduate committee will be responsible for constructing, administering, and grading the examination. The particular format of the exam is at the committee's discretion. Students should meet with each committee member to determine the exam format and content in order to prepare properly.

The comprehensive examination must be successfully completed no later than the semester prior to the semester a student wishes to graduate. Passing the comprehensive examination requires a unanimous committee vote. Students who do not successfully complete the comprehensive examination on their first attempt will be notified in writing by their advisor and may be required to conduct more course work or independent study prior to attempting the exam a second time. Students who fail the comprehensive examination twice will be dismissed from the program. Notification of successful completion of the comprehensive examination must be made known to the department and to the registrar by the committee (Form #9).

#### PETITION TO GRADUATE

Students should submit application for graduation (Form #14) with the registrar by Sept. 15 for fall graduation and by Jan. 15 for spring graduation. Students and their advisors should ensure that all the courses listed on programs of study have been taken and, if necessary, submit substitution forms if changes need to be made. During the final semester, students must take final examinations early (see schedule for graduating seniors) and instructors must submit final grades according to the same schedule.

All requirements for the master's degree must be satisfied within the past six calendar years of a candidate's beginning of a course of study toward a degree. Credit hours older than 72 months will not be counted toward a degree. A minimum of 34 credit hours and at least a 3.0 cumulative GPA are required to graduate. All necessary paperwork must be submitted to the graduate coordinator at least 2 weeks prior to commencement ceremonies.

#### RESIDENCE REQUIREMENTS

The candidate must complete a minimum of 28 hours in residence in order to receive the Master of Science degree from the University of Arkansas at Pine Bluff.

#### FOREIGN LANGUAGE

There is no formal requirement for a foreign language for the Master of Science Degree in Aquaculture/Fisheries. However, the department recognizes the international nature of aquaculture research and the increasing frequency with which international collaboration is occurring. For this reason we encourage students to become familiar with at least one foreign language.

#### PREPARATION OF THE THESIS

Format specifications are outlined in the "Department of Aquaculture and Fisheries Thesis Preparation Guidelines". The style and format for the thesis must follow the "manuscript preparation" guidelines for American Fisheries Society or World Aquaculture Society journals. If specific formats are not covered by the manuscript preparation instructions, students must

follow the style and conventions espoused in the CBE Style Manual (Council of Biological Editors, Chicago).

#### THESIS SEMINAR, DEFENSE, AND SUBMISSION

The thesis will be presented in seminar format. The student must give their entire advisory committee sufficient time (see Time Line in Thesis Preparation Guidelines) to review and approve (Form #10) the thesis for defense prior to scheduling the defense. Notice of the defense must be posted at least one week prior to the event. The student will give a 30-40 minute overview of his/her research and results followed by audience questions (total time 60 minutes). The student's advisor will serve as moderator of the seminar. Following the seminar, the student and committee will meet for the thesis defense. Upon completion of the defense the student will be excused while the committee determines the outcome of the defense (pass/fail). Passing the thesis defense requires a unanimous committee vote. The student will be notified immediately following the defense of his/her success or failure and what changes must be made before the thesis will be given final written approval by the committee. The committee chair will provide written notification of the defense outcome to the student and the graduate coordinator. If the student fails the thesis defense, the student will be given the opportunity to defend a final time at least 30 days after the first defense. If the student fails the second defense, he/she is dismissed from the program.

After making the recommended changes to the thesis, the student will secure written approval from each committee member (signature page). Signatures of each committee member, the graduate coordinator, and the Aquaculture and Fisheries Department Chair are required on the signature page. After receiving the proofread thesis with completed signature page, the advisor notifies the graduate coordinator that the thesis requirement has been fulfilled (Form # 11) and also provides a copy of the thesis cover and signed signature page. **Notification that the thesis is complete must be made two weeks prior to commencement to be included in the program.** Six copies of the proofread thesis must be printed on proper bond paper (25% cotton), copied as a PDF file, and must be submitted to the Aquaculture/Fisheries Research and Education Library technician for their signature (Form #11). Watson Memorial Library will ensure that the paper is the correct bond, ensure that photographs are glued properly, and submit the six copies to the binder. One bound copy is for the student, one copy is for the advisor, two copies are for the library, and two copies are for the department. The cost for reproduction is the responsibility of the student. The cost for binding is the responsibility of the library.

#### EXIT INTERVIEW FORM

Prior to graduation, graduating students must fill out and submit an exit interview form (#16). The form is available online under the graduate program and should be submitted to the Graduate Coordinator.

#### REGISTRATION STATUS OF STUDENTS

Students should always be enrolled, i.e., be registered until graduation. When a student completes all requirements of credit hours for Core Courses, Thesis Research and Graduate Seminar but is yet to complete the thesis, the student is required to register for one (1) credit hour

in "Research and Thesis". If any graduate student is not registered at any time during the regular semesters of fall and spring and the summer semester, the student will be considered to have withdrawn from the program and cannot graduate (see "Withdrawal from the Graduate Program" below). A student who withdraws and wants to graduate has to apply for readmission (see readmission requirements below).

#### WITHDRAWAL FROM THE GRADUATE PROGRAM

Students voluntarily withdrawing from the Master of Science Degree program during a session must submit written notice to the department and the University. This process must be completed at least seven days prior to the beginning of the final examinations.

1. Secure a withdrawal slip from Admissions and Academic Records.
2. Secure approval from the department chair, dean of the college, and the Vice Chancellor for Academic Affairs.
3. Secure clearance from the Student Accounts office.
4. Return the approved slip to the admissions and Academic Records office.

Students who cease to attend classes without submitting written notice of withdrawal will automatically receive an "F" in all courses in which they were enrolled.

#### READMISSION

Application for re-admission to the Aquaculture/Fisheries Master of Science degree program should include:

1. The Application for Admission to the Aquaculture/Fisheries Master of Science degree program.
2. Three letters of recommendation.
3. One copy of transcripts from all schools attended since the student was enrolled in the Aquaculture/Fisheries Master of Science degree program.
4. GRE scores (if scores are more than five (5) years old)

List of Forms for the Master of Science Degree Program: online at [uaex.edu/aqfi/](http://uaex.edu/aqfi/)

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Form	Content
00	Application for admission to UAPB Graduate School
01	Application for admission to Aquaculture/Fisheries Graduate Program
02	Letter of recommendation
03	Approval of credit transfer
04	Formation of graduate advisory committee
05	Change of advisor
06	Change of graduate committee

07	Program of study
08	Change in program of study
09	Notification of successful completion of comprehensive examination
10	Approval for thesis defense
11	Notification to registrar of thesis completion
12	Graduate research problems outline approval
13	Breakage Fee Form
14	Application for Graduation
15	Request for Concurrent Enrollment
16	Affidavit of Support – 1 (International Students Only)
17	Affidavit of Support – 2 (International Students Only)
18	Financial Statement - (International Students Only)
19	Exit Interview Form