



University of Wisconsin Stevens Point

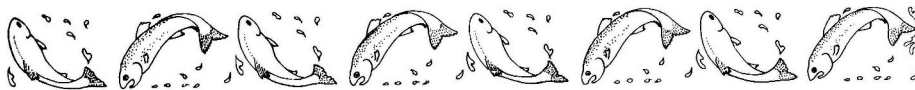
UWSP

▶ AGRICULTURE

▶ EDUCATION

WHAT ARE AQUACULTURE & AQUAPONICS?

Aquaculture (fish farming) and aquaponics (integrated fish & soilless plant production) are transformational global agriculture business practices that range from home-food production to large-scale commercial food-fish businesses. Aquaculture is the science of fish farming, and is a growing sector of agriculture. During the last 20 years, the commercial culture of food fish in the U.S. has increased at an annual rate of over 15%, making it the fastest growing sector of food production in the country. In 2013, global seafood production surpassed beef production. In the U.S., over 50% of seafood comes from farms and the projected per-person increase in seafood consumption should lead to a total increase of 1.5-2.0 million metric tons by 2020. As a refined branch of aquaculture, aquaponics is the integration of fish and plant agriculture. Aquaponics growth in the U.S has been nothing short of *phenomenal* and is driven by the local food movement and safe & sustainable food production.



WHY STUDY AQUACULTURE & AQUAPONICS?

The “Blue Revolution” has progressed so that water recirculating production systems, found both in aquaculture and aquaponics, are the future, since they conserve natural resources while producing dietary protein with the lowest feed conversion ratio. Harvest of wild-caught, ocean fish plateaued over a decade ago so any increases in production of protein-rich food-fish must come from farms. When grown in sustainable, economical, and ecologically responsible manners, farm-raised fish can provide the least-cost form of dietary protein.

Enrollment in college agriculture programs has increased 40% since 2004 as demand for a skilled workforce has exceeded supply and consumers have shifted priorities to food safety, locally-grown, and sustainable practices. Careers in aqua-businesses and personal food production systems need well educated individuals that are trained in multidisciplinary fields in science, technology, engineering and math to successfully advance these agricultural sectors.



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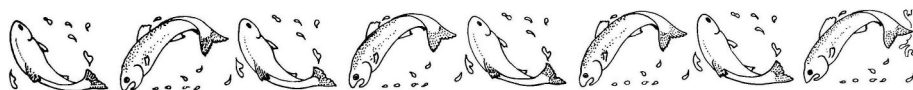
▶ CAREERS

▶ LEARNING PATHWAYS

CAREERS IN AQUACULTURE & AQUAPONICS

Aquaculture & Aquaponics are multidisciplinary fields that have applications in many different professions. University of Wisconsin-Stevens Point graduates have advanced into a wide variety of careers that include:

- Fish culturists/Hatchery managers
- Water quality scientists
- Angling & lure manufacturing
- Veterinarians
- Aquaponic technicians
- Natural resource professionals
- Zoo and aquarium caretakers
- Private, state, federal and Tribal hatchery technicians



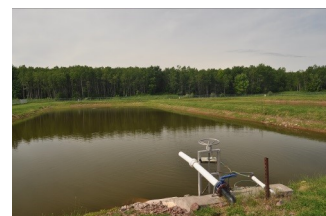
AQUACULTURE & AQUAPONIC LEARNING PATHWAYS

The University of Wisconsin-Stevens Point offers several learning pathways tailored to fit the interests of traditional students, post-graduates, professionals, veterans, and those wanting to continue their education in the fields of aquaculture and aquaponics. Opportunities exist for students to earn academic credit applicable towards the aquaponic certificate and degree programs. Students have the option to take courses for academic credit or non-credit to help meet their personal learning objectives.

Learning pathways include:

- Aquaculture Minor (credit)
- Aquaponic Certificate Program (credit)
- One semester online and in-person courses (credit & non-credit)
- Continuing education 3-day workshop (credit, CEU or non-credit)

Aquaculture and aquaponic programs are multi-disciplinary and satisfy a wide variety of professional pursuits. To enroll in the Aquaculture Minor or declare an Aquaponics Certificate contact the Department of Biology at (715) 346-2159 or email: biology@uwsp.edu



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AQUACULTURE & AQUAPONIC LEARNING PATHWAYS

Aquaculture Minor

The aquaculture minor is available to students enrolled at UWSP. Aquaculture/Fish culture is the discipline that studies the culture of finfish, methods of production, environmental and ecological manipulation and assessment, selective breeding, nutrition, diseases, processing, marketing and operation of culture facilities. To enroll, visit the Department of Biology and complete a Major/Minor enrollment application.

CORE COURSES (16-17 credits)

- Biology/Water 386. Fish Culture. 3 cr.
- Biology 374. Ichthyology. 4 cr.
- Biology 375. Fisheries Ecology. 3 cr. OR Water 388 (3 cr) – Aquatic Ecology. 3 cr.
- Water 390. Water Chemistry & Analysis. 4 cr. OR Water 382. Water & Wastewater Treatment. 3 cr.
- Business 320. Principles of Management. 3 cr.

ELECTIVE COURSES (minimum 10 credits)

- Biology 333. General Microbiology. 4 cr.
- Biology/Water 338. Phycology. 4 cr.
- Biology/Water 361. Aquatic Invertebrate Zoology. 3 cr.
- Biology 362. Animal Parasitology. 4 cr.
- Biology 380. Introduction to Aquaponics. 2 cr.
- Biology 384. Techniques in Aquaponics. 1 cr.
- Biology 499. Internship in Biology. 1-4 cr. OR Water 381. Internship in Water Resources. 1-4 cr.
- Water 384. Life History of Fishes. 3 cr.
- Water 488. Aquatic Insects. 3 cr.
- Water 494. Environmental Toxicology & Risk Assessment. 3 cr.
- Wildlife 360. Wetlands Ecology & Management. 3 cr.
- Wildlife 322. Techniques of Captive Wildlife Management. 2 cr.
- Business 330. Principles of Marketing. 3 cr.



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AQUACULTURE & AQUAPONIC LEARNING PATHWAYS

Aquaponic Certificate Program

The Aquaponic Certificate is awarded upon successful culmination of a series of courses that center on professional and scientific competence and proficiency in the field of aquaponics. Valued by hobbyists, home food producers, farmer's market growers, educators, social organizers and commercial producers, it substantiates your expertise in aquaponics to address a broad range of production and application issues. Program participants will acquire abilities to scientifically understand the roles of water, bacteria, plants and fish in a sustainable, integrated, controlled environment, food production system. Participants such as college students, life-long learners, and those seeking workforce training may complete the course requirements. *Some courses may be taken at other universities with completed credits transferred to UWSP.* To declare the aquaponics certificate or for more information contact the Department of Biology at (715) 346-2159 or email: biology@uwsp.edu

CORE COURSES (14 – 15 credits)

- Biology 130. Introduction to Plant Biology. 5 cr.
- Biology 333. General Microbiology. 4 cr. OR Soil 484. Environmental Microbiology. 3 cr.
- Biology 380. Introduction to Aquaponics. 2 cr.
- Biology 384. Techniques in Aquaponics. 1 cr.
- Biology/Water 386. Fish Culture. 3 cr

ELECTIVE COURSES (6 credits)

- Biology 337. Plant Pathology. 3 cr.
- Biology 338. Phycology. 4 cr.
- Biology 351. Plant Physiology. 4 cr.
- Biology 367. General Entomology. 4 cr.
- Biology 374. Ichthyology. 4 cr.
- Water/Waste/Paper Science 382. Water & Wastewater Treatment. 3 cr.
- Water 390. Water Chemistry & Analysis. 4 cr.
- Business 320. Principles of Management. 3 cr.
- Business 321. Entrepreneurship. 3 cr.
- Business 330. Principles of Marketing. 3 cr.
- Accounting 210. Introductory Financial Accounting. 3 cr.



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▶ LEARNING PATHWAYS

AQUACULTURE & AQUAPONICS LEARNING PATHWAYS

Semester-long Basic & Advanced Aquaponics Courses

Two college courses are available that cover basic or advanced concepts in biological system designs, production techniques, and methods for the integrated science of aquaponics, the combination of aquaculture (fish culture) and hydroponics (soilless plant culture). The courses teach foundational knowledge of aquaponic food production, crop selection, good agriculture & best management practices, and economics & marketing. For information on how to enroll contact UWSP Office of the Registrar (<https://www.uwsp.edu/regrec/Pages/default.aspx>)

Biology 380/580. Introduction to Aquaponics. 2 cr. Online course: Online lectures (January – May) with weekly online discussion sessions

Biology 384/584. Techniques in Aquaponics. 1 cr. In-person lab sessions meet at Nelson & Pade, Inc. Demonstration Greenhouse, Montello, WI.



Continuing Education 3-Day Workshop

The Aquaponics Master Class is a 3-day comprehensive workshop that covers all aspects of Aquaponics and controlled environment agriculture. In partnership with Nelson & Pade, Inc., 1-college credit add-on or Continuing Education Units are available for those that complete this workshop held at Nelson & Pade, Inc.[®], in Montello, WI. More information can be found at: www.aquaponics.com



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▶ PROGRAM BENEFITS

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Professional Credibility

Earning your Aquaculture Minor or Aquaponic Certificate makes a statement. It demonstrates your commitment toward the aquaponics and aquaculture professions and proficiency in sustainable, locally grown food production from a world-class, accredited institution. The Aquaculture Minor and Aquaponic Certificate are prominently displayed on the University of Wisconsin-Stevens Point official transcripts.

Academic Laddering

Make your credits work for you. Should you decide to continue your education, the credits you earn through the aquaculture and aquaponics pathways can be applied to the University's degree-granting program.

Additional Benefits

Once enrolled in one of the aquaculture or aquaponics programs, you have access to the significant academic and technological resources of the University's Northern Aquaculture Demonstration Facility and the Aquaponics Innovation Center. Additional benefits include:

- Career Services assistance
- Support from outreach services
- Internship opportunities and research experiences
- Attendance and presentations at professional conferences and symposia

Hands-on Learning

The **UWSP-Northern Aquaculture Demonstration Facility** is a world-class applied research, demonstration, education and outreach center located in Red Cliff, WI on the Bayfield peninsula. The facility has state-of-the-art pond, flow-through, and recirculating aquaculture production systems (***aquaculture.uwsp.edu***). Additional resources at the facility include:

- Water chemistry laboratory
- Artificial wetland
- Harvest kettle and settling basins
- Incubation and fry/fingerling production units
- Outreach, education, and technical services



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