

# FISHERY RESOURCES (FISH)

## **FISH 102 The Fish and Wildlife Professions (1 credit)**

Cross-listed with WLF 102

Orientation of students to the profession of fishery resources and wildlife resources: introduction to fish and wildlife faculty, review of fish and wildlife curriculum, awareness of career opportunities, employment procedures, associated job duties/responsibilities, job preparation, educational preparation, and management challenges in the Pacific Northwest. (Fall only)

## **FISH 200 (s) Seminar (1-16 credits)**

Credit arranged

## **FISH 203 (s) Workshop (1-16 credits)**

Credit arranged

## **FISH 204 (s) Special Topics (1-16 credits)**

Credit arranged

## **FISH 299 (s) Directed Study (1-16 credits)**

Credit arranged

## **FISH 314 Fish Ecology (3 credits)**

Examination of physical, chemical, and biological factors that affect fish populations and communities, with emphasis on environmental stressors. Typically Offered: Fall.

**Prereqs:** FOR 221, REM 221, WLF 220, or BIOL 314. Cooperative: open to WSU degree-seeking students.

## **FISH 315 Fish Ecology Field Techniques and Methods (2 credits)**

Laboratory and field experience in fish ecology with emphasis on field techniques, laboratory experimentation, and habitat assessment. One weekend field trip and several day trips required. (Fall only)

**Prereqs:** FOR 221, NR 321, or BIOL 314

## **FISH 398 (s) Renewable Natural Resources Internship (1-16 credits)**

Credit arranged. Supervised field experience with an appropriate public or private agency. Required for cooperative education students. Graded P/F.

**Prereqs:** Permission of department

## **FISH 400 (s) Seminar (1-16 credits)**

Credit arranged

## **FISH 403 (s) Workshop (1-16 credits)**

Credit arranged

## **FISH 404 (s) Special Topics (1-16 credits)**

Credit arranged

## **FISH 411 Fish Physiology (2 credits)**

Joint-listed with FISH 511

Physiology of fishes, their implications, and applications. Principles and methods used to study organ systems and physiological mechanisms of homeostatic regulation in fishes.

**Prereqs:** FISH 481

## **FISH 415 Limnology (4 credits)**

Joint-listed with FISH 535

Examination of physical, chemical, and biological characteristics of inland waters. Laboratory focus will be on sampling waterbodies in Idaho, equipment use, and analysis of samples. Part of the course is dedicated to a service-learning project to tackle a real-world problem in limnology. Two lectures and one 4-hour laboratory per week. Depending on the service-learning project, one 1-day weekend field trip may be required. Additional reading, and/or collation of service-learning reports, and/or written reports of assigned literature required for graduate credit. Typically Offered: Fall.

**Prereqs:** STAT 251 and FOR 221, REM 221, WLF 220 or BIOL 314.

Cooperative: open to WSU degree-seeking students.

## **FISH 418 Fisheries Management (4 credits)**

General Education: Senior Experience

Techniques employed in sampling and application of principles toward managing recreational and commercial aquatic resources. Three lectures and one 3-hour lab per week; two weekend field trips. (Fall only)

**Prereqs:** FISH 314 and FISH 481 and STAT 251 Cooperative: open to WSU degree-seeking students.

## **FISH 422 Concepts in Aquaculture (4 credits)**

Concepts and methods of extensive and intensive aquaculture in warm water and cold water systems. Two field trips required (a 1-day and a 3-day field trip). Cooperative: open to WSU degree-seeking students. (Spring only)

**Prereqs or Coreqs:** FISH 481

## **FISH 424 Fish Health Management (4 credits)**

Epidemiology, prevention, diagnostics, and treatment of infections and non-infectious diseases of free-living and confined finfish and shellfish. Two field trips required (a 1-day and a 3-day field trip). Recommended Preparation: FISH 422. Cooperative: open to WSU degree-seeking students. (Spring only)

**Prereqs:** BIOL 250

## **FISH 430 Riparian and River Ecology (3 credits)**

Course focuses on the ecology of riverscapes; the structure, function and management of fluvial ecosystems; and the interrelationships between rivers and their riparian ecosystems. Course seeks to integrate aspects of hydrology, fluvial geomorphology, aquatic entomology, riparian habitat, fish communities and human impacts to provide a multidisciplinary understanding of riverscapes. At least 2 half day field trips will be required. Special fee required. Typically Offered: Spring.

**Prereqs:** FOR 221, REM 221, WLF 220, or BIOL 314

## **FISH 450 Ecology & Conservation of Freshwater Invertebrates (2 credits)**

Joint-listed with FISH 550

The course will survey the evolutionary origins and identification of major groups of invertebrates occurring in freshwaters, examine the key behavioral, morphological, and physiological traits possessed by freshwater invertebrates, identify the key ecological roles and influence of invertebrates in freshwater ecosystems and ecosystem services, and demonstrate how freshwater invertebrates can be used to monitor water quality and ecosystem condition. Cooperative: open to WSU degree-seeking students. (Spring, alt/years)

**Prereqs:** BIOL 114 or ENT 322 or Permission.

**FISH 451 Freshwater Invertebrate Field Methods (2 credits)**

Joint-listed with FISH 551

The course will survey the systematics and identification of freshwater invertebrates and demonstrate how freshwater invertebrates can be used to monitor water quality and ecosystem condition. Students will collect and identify freshwater invertebrates from habitats surrounding Moscow, Idaho during an intensive field course. The course will occur on one weekend in February and five days of Spring Break. The course has two required field trips. Cooperative: open to WSU degree-seeking students. (Spring, alt/years)

**Prereqs:** BIOL 114 or ENT 322 or Permission

**Coreqs:** FISH 450

**FISH 473 ECB Senior Presentation (1 credit)**

General Education: Senior Experience

Cross-listed with FOR 473, FSP 473

, NRS 473, REM 473, WLF 473. Reporting and presenting the senior project (thesis or internship); taken after or concurrently with REM 497. Serves as the senior capstone course for Ecology and Conservation Biology (ECB).

**Prereqs:** Instructor Permission

**FISH 481 Ichthyology (4 credits)**

Anatomy, systematics, physiology, behavior, genetics and zoogeography of fishes. Three lectures and one 3-hour lab per week. Course has two required field trips. (Spring only).

**Prereqs:** BIOL 114 and BIOL 115, and BIOL 213 or instructor permission

**FISH 483 Senior Project Presentation (1 credit)**

Cross-listed with WLF 483

Reporting and presenting the senior project (thesis or internship); taken after or concurrently with FISH 497.

**FISH 485 Ecology and Conservation Biology Senior Project (1-3 credits, max 3)**

Cross-listed with FOR 485, NRS 485, and WLF 485

Scholarly work; learning objectives include development and formal proposal of a specific project and conducting the project or research with the guidance of a faculty mentor.

**FISH 495 (s) Fisheries Seminar (1 credit)**

General Education: Senior Experience

Discuss integrating biological, social, political, economic, and philosophic aspects of problems in managing fishery resources. (Spring only)

**Prereqs:** Senior standing

**FISH 497 Senior Thesis (1-3 credits, max 6)**

Preparation of thesis, exhibition, video, computer program, multimedia program, or other creative presentation based on research conducted under the guidance of a faculty mentor.

**Prereqs:** Cumulative GPA of at least 3.2 in all college courses, completion of at least 90 credits, and permission of a faculty mentor.

**FISH 498 (s) Internship (1-16 credits)**

Credit arranged. The internship serves to provide hands-on experience for students interested in fisheries and aquaculture.

**Prereqs:** Instructor permission

**FISH 499 (s) Directed Study (1-16 credits)**

Credit arranged. For the individual student; conferences, library, field, or lab work.

**Prereqs:** Senior standing, GPA 2.5, and Permission

**FISH 500 Master's Research and Thesis (1-16 credits)**

Credit arranged

**FISH 501 (s) Seminar (1-16 credits)**

Credit arranged. Major philosophy, management, and research problems of wildlands; presentation of individual studies on assigned topics.

**FISH 502 (s) Directed Study (1-16 credits)**

Credit arranged

**FISH 503 (s) Workshop (1-16 credits)**

Credit arranged. Selected topics in the conservation and management of fish and aquatic systems. Cooperative: open to WSU degree-seeking students.

**Prereqs:** Permission

**FISH 504 (s) Special Topics (1-16 credits)**

Credit arranged New selected topics in the conservation and management of fish and aquatic systems. Cooperative: open to WSU degree-seeking students.

**FISH 511 Fish Physiology (2 credits)**

Joint-listed with FISH 411

Physiology of fishes, their implications, and applications. Principles and methods used to study organ systems and physiological mechanisms of homeostatic regulation in fishes. Cooperative: Open to WSU degree-seeking students. (Spring, alt/years)

**Prereqs:** Permission

**FISH 515 Large River Fisheries (2 credits)**

Management issues and problems in large river fisheries in North America and globally; importance of flood plains; ecological bases for management actions in large rivers; river fisheries in the context of multiple use of large rivers. Cooperative: open to WSU degree-seeking students. (Fall, alt/years)

**FISH 525 Aquaculture in Relation to Wild Fish Populations (2 credits)**

Historical and current relationships between wildness and domestication as it relates to fisheries management and aquaculture in mitigation and industry. Interactions between wild and hatchery-reared fishes, including salmon. Cooperative: open to WSU degree-seeking students. (Fall, alt/years)

**FISH 526 Climate Effects & Cons Manage (2 credits)**

Climate change and the conservation and management of populations and ecosystems. This graduate seminar will examine the current understanding of climate controls on ecosystems, likely scenarios for climate change in coming years, effects on fish and wildlife communities and populations and policy discussions as they relate to conservation and management using analysis of primary literature, and oral and written assignments. Cooperative: open to WSU degree-seeking students. (Fall, alt/years)

**Prereqs:** Previous coursework in ecology or Permission.

**FISH 535 Limnology (4 credits)**

Joint-listed with FISH 415

Examination of physical, chemical, and biological characteristics of inland waters. Laboratory focus will be on sampling waterbodies in Idaho, equipment use, and analysis of samples. Part of the course is dedicated to a service-learning project to tackle a real-world problem in limnology. Two lectures and one 4-hour laboratory per week. Depending on the service-learning project, one 1-day weekend field trip may be required. Additional reading, and/or collation of service-learning reports, and/or written reports of assigned literature required for graduate credit. Typically Offered: Fall. Cooperative: open to WSU degree-seeking students.

**FISH 540 Wetland Restoration (3 credits)**

This web-based course contains modules covering wetland science, restoration ecology, freshwater restoration, coastal restoration, and monitoring/maintenance. The emphasis is on the science of wetland ecosystems and the applied ecology/practice of restoration, with additional consideration of cultural and socio-political contexts. Extensive readings, an assignment, and a study guide are required for each module. Students apply their learning in and contribute relevant professional experience to weekly online discussions. Students are also responsible for obtaining documentation of at least one wetland restoration site in their region and conducting a site visit in order to evaluate the success of the restoration project. A final exam (re-design of a failed restoration project) is administered online, with partial credit earned through discussion with an interdisciplinary team of classmates and the remaining credit earned through individual analysis and synthesis. (Fall only)

**Prereqs:** BIOL 114 and BIOL 115; and FOR 221 or BIOL 314 or Permission

**FISH 550 Ecology & Conservation of Freshwater Invertebrates (2 credits)**

Joint-listed with FISH 450

The course will survey the evolutionary origins and identification of major groups of invertebrates occurring in freshwater, examine the key behavioral, morphological, and physiological traits possessed by freshwater invertebrates, identify the key ecological roles and influence of invertebrates in freshwater ecosystems and ecosystem services, and demonstrate how freshwater invertebrates can be used to monitor water quality and ecosystem condition. Cooperative: open to WSU degree-seeking students. (Spring, alt/years)

**FISH 551 Freshwater Invertebrate Field Methods (2 credits)**

Joint-listed with FISH 451

The course will survey the systematics and identification of freshwater invertebrates and demonstrate how freshwater invertebrates can be used to monitor water quality and ecosystem condition. Students will collect and identify freshwater invertebrates from habitats surrounding Moscow, Idaho during an intensive field course. The course will occur on one weekend in February and five days of Spring Break. The course has two required field trips. Cooperative: open to WSU degree-seeking students. (Spring, alt/years)

**Prereqs:** BIOL 114 or ENT 322 or Permission

**Coreqs:** FISH 450

**FISH 560 Advanced Fisheries Techniques (3 credits)**

This course focuses on sampling techniques and designs, length structure and body condition indices, age and growth of fishes, mortality estimation, and age-structured population models used in the management of exploited fish populations. Typically Offered: Spring (Odd Years).

**Prereqs:** STAT 431; instructor permission required Cooperative: open to WSU degree-seeking students.

**FISH 598 (s) Internship (1-16 credits)**

Credit arranged

**FISH 599 (s) Non-thesis Master's Research (1-16 credits)**

Credit arranged. Research not directly related to a thesis or dissertation.

**Prereqs:** Permission

**FISH 600 Doctoral Research and Dissertation (1-45 credits)**

Credit arranged