Twin Cities Campus

Conservation Sciences M.S.

Fisheries, Wildlife, and Conservation Biology

College of Food, Agricultural and Natural Resource Sciences

Link to a list of faculty for this program.

Contact Information:
Department of Fisheries, Wildlife, and Conservation Biology, 135 B Skok Hall, 2003 Upper Buford Circle, St. Paul, MN 55108 (612-624-7751)
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- Program Type: Master's
- Requirements for this program are current for Fall 2017
- Length of program in credits: 30
- This program does not require summer semesters for timely completion.
- Degree: Master of Science

Along with the program-specific requirements listed below, please read the General Information section of the catalog website for requirements that apply to all major fields.

The conservation sciences (CS) program has two complementary objectives leading to a unique multidisciplinary program. The first is to provide students with sound graduate training in the biological sciences relevant to the global conservation of plants, animals, and ecosystems. The second objective promotes the study of social, political, and economic sciences that relate to recognition and solution of conservation problems. Students may select one of the three tracks, 1) conservation science or 2) fisheries and aquatic biology or 3) wildlife ecology & management. Students may also pursue a joint degree in law and conservation sciences through the joint law degree program. The overall goal of the program is to prepare students to develop solutions or approaches to address problems that are scientifically and environmentally sound and likely to be acted upon or implemented within their social and political context.

Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

Prerequisites for Admission

The preferred undergraduate GPA for admittance to the program is 3.00.

A BS/BA degree in biology or a closely related field is preferred. Applicants with a baccalaureate degree in another field are accepted, but may be required to take selected courses in biology.

Special Application Requirements:
A statement of career goals and three letters of recommendation evaluating the applicant's potential for graduate study are required. Scores less than five years old from the General Test of the GRE are required. TOEFL is required for applicants who speak English as a second language. Applicants to the joint law degree program must also apply to the Law School. Application deadline is December 15. Typically, students only are admitted for fall semester.

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
- MELAB
  - Final score: 80
- MN Batt

Key to test abbreviations(GRE, TOEFL, IELTS, MELAB, MN Batt).

For an online application or for more information about graduate education admissions, see the General Information section of the catalog website.

Program Requirements

Plan A: Plan A requires 14 major credits, 6 credits outside the major, and 10 thesis credits.The final exam is oral.

Plan B: Plan B requires 14 major credits and 6 credits outside the major.The final exam is oral. A capstone project is required.
Capstone Project: Plan B master's students must demonstrate familiarity with the tools of research or scholarship in their major field, the ability to work independently, and the ability to present the results of their investigation effectively, by completing at least one Plan B project. The Plan B project should involve a combined total of approximately 120 hours (the equivalent of three full-time weeks) of work. The advisory committee specifies both the nature and extent of the options available to satisfy this requirement, subject to approval by the director of graduate studies. The Plan B project must be satisfied independent of the courses in the student's program.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.0 is required for students to remain in good standing.

At least 1 semesters must be completed before filing a Degree Program Form.

Core Course
Take the following course for 3 credits:
FW 8452 - Conservation Biology (3.0 cr)

Seminar Requirement
Take 2 semesters of CBIO 8001. Students in the fisheries and aquatic biology track may substitute one semester of CBIO 8001 with FW 8200.
Take 2 or more credit(s) from the following:
•CONS 8001 - Conservation Biology Seminar (1.0 cr)
•FW 8200 - Seminar (1.0 - 4.0 cr)

Statistics Requirement
Take at least one 3-credit statistics or systematics course from following list, or select other 5xxx- or 8xxx-level coursework in consultation with the advisory committee.
Take 3 or more credit(s) from the following:
•BIOL 5272 - Applied Biostatistics (4.0 cr)
•STAT 5021 - Statistical Analysis (4.0 cr)
•STAT 5302 - Applied Regression Analysis (4.0 cr)
•STAT 5303 - Designing Experiments (4.0 cr)
•STAT 5421 - Analysis of Categorical Data (3.0 cr)
•STAT 5601 - Nonparametric Methods (3.0 cr)
•FW 8051 - Statistical Modeling of Ecological Data using R and WinBugs/JAGS (4.0 cr)
•EEB 5371 - Principles of Systematics (3.0 cr)

Plan Options

Plan A
Take at least 10 master's thesis credits.
CONS 8777 - Thesis Credits: Master's (1.0 - 18.0 cr)

-OR-

Plan B
Take an additional 10 elective course credits, chosen in consultation with the advisor. Coursework may be from the electives section of the chosen track, or other 5xxx- or 8xxx-level courses.
Joint- or Dual-degree Coursework:JD/Conservation Sciences-MSStudent may take a total of 12 credits in common among the academic programs.

Program Sub-plans

Students are required to complete one of the following sub-plans.

Students may not complete the program with more than one sub-plan.

Conservation Science

The conservation science track is available for students wishing to emphasize this concentration within the conservation sciences degree. The track provides structure and oversight for students interested in the interface of population, species, and ecosystem biology with disciplines of social sciences, education, economics. The conservation science track name will be posted to the transcript.

Conservation Science - Electives

Take at least 12 (Plan A) or at least 22 (Plan B) elective credits from the following list, or select other 5xxx- or 8xxx-level coursework in consultation with the advisory committee.

Take 12 or more credit(s) from the following:

- APEC 5151 - Applied Microeconomics: Firm and Household (3.0 cr)
- APEC 5651 *{Inactive}*(3.0 cr)
- EEB 4129 - Mammalogy (4.0 cr)
- EEB 4134 - Introduction to Ornithology (4.0 cr)
- EEB 5042 - Quantitative Genetics (3.0 cr)
- EEB 5327 *{Inactive}*(3.0 cr)
- EEB 5409 - Evolution (3.0 cr)
- EEB 5609 - Ecosystem Ecology (3.0 cr)
- ENT 4231 *{Inactive}*(3.0 cr)
- ENT 5011 - Insect Structure and Function (4.0 cr)
- ENT 5041 - Insect Ecology (3.0 cr)
- EPSY 5221 - Principles of Educational and Psychological Measurement (3.0 cr)
- EPSY 5243 - Principles and Methods of Evaluation (3.0 cr)
- FNRM 5104 - Forest Ecology (4.0 cr)
- FNRM 5114 - Hydrology and Watershed Management (3.0 cr)
- FNRM 5131 - Geographical Information Systems (GIS) for Natural Resources (4.0 cr)
- FNRM 5203 - Forest Fire and Disturbance Ecology (3.0 cr)
- FNRM 5204 - Landscape Ecology and Management (3.0 cr)
- FNRM 5262 - Remote Sensing and Geospatial Analysis of Natural Resources and Environment (3.0 cr)
- FW 5003 - Human Dimensions of Biological Conservation (3.0 cr)
- FW 5051 - Analysis of Populations (4.0 cr)
- FW 5603W - Habitats and Regulation of Wildlife [WI] (3.0 cr)
- FW 5625 - Wildlife Handling and Immobilization for Research and Management (2.0 cr)
- GEOG 8280 - Biogeography (3.0 cr)
- HORT 5071 - Ecological Restoration (4.0 cr)
- LA 5202 - Landscape Analysis Workshop (1.0 cr)
- LA 5204 - Metropolitan Landscape Ecology (3.0 cr)
- PA 5251 - Strategic Planning and Management (3.0 cr)
- PA 5253 *{Inactive}*(3.0 cr)
- PA 5501 - Theories and Policies of Development (3.0 cr)
- PA 5511 - Community Economic Development (3.0 cr)
- VMED 5181 - Spatial Analysis in Infectious Disease Epidemiology (3.0 cr)

Fisheries and Aquatic Biology

Three-quarters of the global ecosystem is water and most is a global commons. Many biologists and economists argue that freshwater is one of the most critical global resources and that the functional integrity and biodiversity within freshwater and marine ecosystems are highly threatened. The fisheries and aquatic biology (FAB) track is available for MS, PhD, and joint degree students wishing to emphasize this concentration. The track name will be posted to the transcript, and may be useful to the graduate for obtaining jobs with many federal and state agencies where such expertise is specified in job announcements or hiring criteria. The track designation clearly indicates that the student has specialized coursework and research or project experience leading to expertise in fisheries or aquatic biology. Combined with a typical undergraduate degree in biology or natural resource science, careful selection of courses in the graduate program will satisfy the educational requirements for professional certification by the American Fisheries Society.

Students in the track must be advised or co-advised by a faculty member affiliated with the track. Requests for admission to the track may be made during the application process or at any time after the student is admitted to conservation sciences. Students in the track must meet all MS degree requirements.

Students who designate this track will be expected to work closely with their Student Advisory Committee (SAC) to develop an appropriate course of study. The track coordinator will review each student's academic program to examine how track expectations are met and forward it with a recommendation to the director of graduate studies for approval.

Fisheries & Aquatic Biology - Required Courses

Take a minimum of 6 credits from the following list. Other advanced courses or colloquia on fisheries or aquatic biology, not listed here, may satisfy track requirements; consult with the track coordinator.

Take 6 or more credit(s) from the following:

•EEB 5601 - Limnology (3.0 cr)
•EEB 5605 *{Inactive}*(2.0 cr)
•EEB 8601 - Introduction to Stream Restoration (3.0 cr)
•EEB 8602 - Stream Restoration Practice (2.0 cr)
•ENT 4361 - Aquatic Insects (3.0 cr)
•FNRM 5114 - Hydrology and Watershed Management (3.0 cr)
•FNRM 5153 - Forest Hydrology & Watershed Biogeochemistry (3.0 cr)
•FW 4401 - Fish Physiology and Behavior (3.0 cr)
•FW 5136 - Ichthyology (4.0 cr)
•FW 5601 *{Inactive}*(3.0 cr)
•FW 5003 - Human Dimensions of Biological Conservation (3.0 cr)
•FW 8459 - Stream and River Ecology (3.0 cr)
•FW 8465 - Fish Habitats and Restoration (3.0 cr)

Fisheries & Aquatic Biology - Electives

Take at least 6 (Plan A) or 16 (Plan B) course credits from following list, or select 5xxx- or 8xxx-level coursework in consultation with the advisory committee.

Take 6 or more credit(s) from the following:

•APEC 5151 - Applied Microeconomics: Firm and Household (3.0 cr)
•APEC 5651 *{Inactive}*(3.0 cr)
•EEB 5042 - Quantitative Genetics (3.0 cr)
•EEB 5327 *{Inactive}*(3.0 cr)
•EEB 5409 - Evolution (3.0 cr)
•EEB 5609 - Ecosystem Ecology (3.0 cr)
•ENT 4231 *{Inactive}*(3.0 cr)
•ENT 5011 - Insect Structure and Function (4.0 cr)
•ENT 5041 - Insect Ecology (3.0 cr)
•EPSY 5221 - Principles of Educational and Psychological Measurement (3.0 cr)
•EPSY 5243 - Principles and Methods of Evaluation (3.0 cr)
•FNRM 5114 - Hydrology and Watershed Management (3.0 cr)
•FNRM 5131 - Geographical Information Systems (GIS) for Natural Resources (4.0 cr)
•FNRM 5204 - Landscape Ecology and Management (3.0 cr)
•FNRM 5262 - Remote Sensing and Geospatial Analysis of Natural Resources and Environment (3.0 cr)
•FW 5003 - Human Dimensions of Biological Conservation (3.0 cr)
•FW 5051 - Analysis of Populations (4.0 cr)
•GEOG 8280 - Biogeography (3.0 cr)
•HORT 5071 - Ecological Restoration (4.0 cr)
•LA 5202 - Landscape Analysis Workshop (1.0 cr)
•LA 5204 - Metropolitan Landscape Ecology (3.0 cr)
•PA 5251 - Strategic Planning and Management (3.0 cr)
•PA 5253 *{Inactive}*(3.0 cr)
•PA 5511 - Community Economic Development (3.0 cr)
•VMED 5181 - Spatial Analysis in Infectious Disease Epidemiology (3.0 cr)

Wildlife Ecology and Management

The Wildlife Ecology and Management track is available for students wishing to emphasize this concentration within the conservation sciences degree. The track provides structure and oversight for students interested in the ecology and management of both game and non-game wildlife species. The track name will be posted to the transcript, and may be useful to the graduate for obtaining jobs with many federal and state agencies where such expertise is specified in job announcements or hiring criteria. The track designation clearly indicates that the student has specialized coursework and research or project experience leading to expertise in wildlife ecology & management.

Students in the track must be advised or co-advised by a faculty member affiliated with the track. Requests for admission to the track may be made during the application process or at any time after the student is admitted to conservation sciences. Students in the track must meet all MS degree requirements. Students who designate this track will be expected to work closely with their Student Advisory Committee (SAC) to develop an appropriate course of study. The track coordinator will review each student's academic program to examine how track expectations are met and forward it with a recommendation to the director of graduate studies for approval.

Wildlife Ecology and Management - Electives

Take at least 12 (Plan A) or at least 22 (Plan B) elective credits from the following list, or select other 5xxx- or 8xxx-level coursework in consultation with the advisory committee.

Take 12 or more credit(s) from the following:

•APEC 5151 - Applied Microeconomics: Firm and Household (3.0 cr)
•APEC 5651 *{Inactive}*(3.0 cr)
•EEB 4129 - Mammalogy (4.0 cr)
•EEB 4134 - Introduction to Ornithology (4.0 cr)
•EEB 5042 - Quantitative Genetics (3.0 cr)

•EEB 5327 *{Inactive}*(3.0 cr)
•EEB 5409 - Evolution (3.0 cr)
•EEB 5609 - Ecosystem Ecology (3.0 cr)
•ENT 4231 *{Inactive}*(3.0 cr)
•ENT 5011 - Insect Structure and Function (4.0 cr)
•ENT 5041 - Insect Ecology (3.0 cr)
•EPSY 5243 - Principles and Methods of Evaluation (3.0 cr)
•FNRM 5104 - Forest Ecology (4.0 cr)
•FNRM 5114 - Hydrology and Watershed Management (3.0 cr)
•FNRM 5131 - Geographical Information Systems (GIS) for Natural Resources (4.0 cr)
•FNRM 5203 - Forest Fire and Disturbance Ecology (3.0 cr)
•FNRM 5204 - Landscape Ecology and Management (3.0 cr)
•FNRM 5262 - Remote Sensing and Geospatial Analysis of Natural Resources and Environment (3.0 cr)
•FW 5003 - Human Dimensions of Biological Conservation (3.0 cr)
•FW 5051 - Analysis of Populations (4.0 cr)
•FW 5603W - Habitats and Regulation of Wildlife [WI] (3.0 cr)
•FW 5625 - Wildlife Handling and Immobilization for Research and Management (2.0 cr)
•GEOG 8280 - Biogeography (3.0 cr)
•HORT 5071 - Ecological Restoration (4.0 cr)
•LA 5202 - Landscape Analysis Workshop (1.0 cr)
•LA 5204 - Metropolitan Landscape Ecology (3.0 cr)
•PA 5251 - Strategic Planning and Management (3.0 cr)
•PA 5253 *{Inactive}*(3.0 cr)
•PA 5501 - Theories and Policies of Development (3.0 cr)
•PA 5511 - Community Economic Development (3.0 cr)
•VMED 5181 - Spatial Analysis in Infectious Disease Epidemiology (3.0 cr)