# Curriculum Proposal

**BIOL 17-18 #18**

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**Course Modification**

| 1.2 BIOL 3362/5362 Stream and River Ecology (4 credits) **to** Streams and Rivers |

**Course Drop**

| 1.5 BIOL 3554 Readings in Aquatic Biology (1 credit) |
| 1.7 BIOL 4031/5031 Advanced Wetland Delineation (2 credits) |

**Program Modification**

| 1.9 Aquatic Biology, Aquatic Systems Emphasis **major** |
| 1.9 Aquatic Biology, Fisheries Biology Emphasis **major** |
| 1.9 Aquatic Biology, Wetlands Ecology Emphasis **major** |

| 1.24 Signatures |
BSU Curriculum Forms

Form 1

Curriculum Modification Summary

College: CAS
Department: Biology
Proposer: Andrew W. Hafs
Proposer’s position: Associate Professor of Biology
Describe the modification(s) you propose, and how it (/they) will work to students’ advantage. (This description and explanation will be included in Curriculum Report packets forwarded to the Faculty Senate.):

• Increase GPA requirement to 2.50 for all three emphases within the Aquatic Biology major
  o Students that graduate with a GPA below 2.50 are not competitive for employment/graduate school within the field of aquatic biology
• Drop BIOL 3554 Readings in Aquatic Biology (1 credit) from all three emphases in the Aquatic Biology major
  o The material covered in this course is now covered in other classes within each emphasis, additionally this will reduce the size of the major and provide students with an easier path to graduation
• Drop GEOG 3231 Introduction to Geographic Information Systems (3 credits) from the ELECTIVE CORE COURSES within the Wetlands Ecology emphasis
  o GEOG 3231 Introduction to Geographic Information Systems is already in the Aquatic Biology core requirements. This was an error from our last round of curriculum changes that we would like to have fixed.
• Drop BIOL 4031/5031 Advanced Wetland Delineation (2 credits) from the Wetlands Ecology emphasis
  o Current faculty do not have room in their load to teach this course.
• Add BIOL 3400 Fish & Wildlife Law and Administration (3 credits) as an option to the Elective Core Courses for the Fisheries Biology emphasis within the Aquatic Biology major
  o This course meets American Fisheries Society human dimensions requirement for certification as a Fisheries Biologist. By adding this course into the elective section students have more options to meet this requirement and therefore will have an easier time navigating schedule conflicts.
• Add GEOL 3212 Hydrogeology (3 credits) as an option to the core aquatic biology courses to be taken in place of CHEM 3150 Standard Methods of Water Analysis (3 credits) or GEOL 3211 Environmental Hydrology (3 credits)
  o Adding this course as an option will provide foundational knowledge related to hydrology or water chemistry we are aiming for with this requirement, while also offering a course in a different semester than...
GEOL 3211 Environmental Hydrology. This will ease scheduling conflicts for our students.

- Change the name of BIOL 3362/5362 Stream and River Ecology (4 credits) to Streams and Rivers
  - The new name would better reflect the content provided in the course.
- Drop BIOL 4898 Fisheries Research I (2 credits) and BIOL 4899 Fisheries Research II (2 credit) as capstone options for the Aquatic Systems and Wetlands Ecology emphases in the Aquatic Biology major
  - This will make the three Aquatic Biology emphases more distinct.
- Add STAT 3610 Time Series Analysis (3 credits) as an option within the statistics and math requirement section of the Fisheries Biology emphasis in the Aquatic Biology major
  - Time series data is commonly analyzed in fisheries biology and therefore the course would be beneficial to our students. This will also allow for more flexibility with student scheduling.
- Add GEOG 4265 Spatial Analysis (3 credits) as an option within the statistics and math requirement section of the Fisheries Biology emphasis in the Aquatic Biology major
  - GIS is commonly used in fisheries biology and therefore the course would be beneficial to our students. This will also allow for more flexibility with student scheduling.

Modifications proposed (specify number of each):

- 1 Course Modification(s) (form 2)
- 0 New Course(s) (form 3)
- 2 Course Drop(s) (form 4)
- 1 Program Modification(s) (form 5)
- 0 New Program(s) (form 6)
- 0 Program Drop(s) (form 7)

The modifications affect (check):

- Liberal Education
- Undergraduate Curriculum
- Graduate Curriculum
- Teacher Licensure Program(s)
BSU Curriculum Forms

Form 2
Updated 9.19.15

Course Modification Form

Current Course Number(s):
   Undergraduate: BIOL 3362
   Graduate: BIOL 5362
Proposed Course Number(s), if different:
   Undergraduate:
   Graduate:

Current Course Title: Stream and River Ecology
Proposed Course Title, if different: Streams and Rivers

Current Course Description: An introduction to the physical characteristics, chemistry, and biology of lotic systems such as streams and rivers. Includes information on morphology, hydrology, and alteration of these natural systems. Includes laboratory simulations and field exercises. Lecture and laboratory. Prerequisite(s): BIOL 1211 and BIOL 1212

Proposed Course Description, if different:

Current Credits: 4
Proposed Credits, if different:

Current Prerequisite(s):
   Undergraduate: BIOL 1211 and BIOL 1212
   Graduate:
Proposed Prerequisite(s), if different:
   Undergraduate:
   Graduate:

1) Reason(s) for change(s): The new name would better reflect the content provided in the course.

2) May this modified course replace the current course for students remaining in the old curriculum? Yes ___X___ No _____ If not, please drop the current course and submit a new course form for the modification.

3) Do these modifications change any of the following? For all Yes answers, please provide updated information on the next page.
   Student Learning Outcomes   Yes ____ No ___X___
   Major Content Areas          Yes ____ No ___X___
   Projected Maximum Class Size (Cap)   Yes ____ No ___X___
4) Current Course fee(s) per student: $15 per credit as part of Biology differential tuition fee for: Proposed Course fee(s) per student, if different: $
for:

5) Service Areas:
This course is a requirement or an elective in the programs/areas listed below. To locate where this course appears please search the online catalog, as follows:
   a) go to http://www.bemidjistate.edu/academics/catalog/ and choose the most recent catalog(s),
   b) click on “Areas of Study, and Course Descriptions,”
   c) click on “PDF of Entire Catalog” in upper right,
   d) press Ctrl F, and enter the prefix and number of the course(s) from this form.

Non-licensure programs: NA

Teacher Licensure programs: NA

Liberal Education: NA

The above “service area” programs/departments were notified of this modification on _______ (date) by ____________________ (mail, email, or phone).

Please check one of the items below:

       ____ No comments were received from other programs or departments within one week of the notification.

       ____ Comments were received within one week of the notification, and are attached.
BSU Curriculum Forms

Form 4

Course Drop Form
(Use this form to drop a course from the university curriculum file.
To drop a course from a program only, use Form 5 Program Modification Form)

Course Number: BIOL 3554
   Undergraduate: Readings in Aquatic Biology
   Graduate: NA

Course Title: Readings in Aquatic Biology

New or current courses that will universally replace this dropped course for students remaining in the old curriculum:

Material covered in BIOL 3361 Limnology, and Capstone requirements

This dropped course is a requirement or an elective in the programs/areas listed below.
To locate where this course appears please search the online catalog, as follows:
   1) go to http://www.bemidjistate.edu/academics/catalog/ and choose the most recent catalog(s),
   2) click on “Areas of Study, and Course Descriptions,”
   3) click on “PDF of Entire Catalog” in upper right,
   4) press Ctrl F, and enter the prefix and number of the course(s) from this form.

Non-licensure programs:

   Aquatic Biology Major

   Aquatic Systems Emphasis

   Fisheries Biology Emphasis

   Wetlands Ecology Emphasis

   Teacher Licensure programs: None

   Liberal Education: None

The above “service area” programs/departments were notified of this modification on ________ (date) by ____________________ (mail, email, or phone).
NA – No other programs/departments are influenced by this drop.

Please check one of the items below:

______ No comments were received from other programs or departments within one week of the notification.

______ Comments were received within one week of the notification, and are attached.

**Reason(s) for dropping this course:**

The material covered in this course is now covered in other classes within each emphasis, additionally, this will reduce the size of the major and provide students with an easier path to graduation
BSU Curriculum Forms

Form 4

Course Drop Form
(Use this form to drop a course from the university curriculum file. To drop a course from a program only, use Form 5 Program Modification Form)

Course Number: BIOL 4031/5031
  Undergraduate: Advanced Wetland Delineation
  Graduate: Advanced Wetland Delineation

Course Title: Advanced Wetland Delineation

New or current courses that will universally replace this dropped course for students remaining in the old curriculum:

None

This dropped course is a requirement or an elective in the programs/areas listed below. To locate where this course appears please search the online catalog, as follows:
  1) go to http://www.bemidjistate.edu/academics/catalog/ and choose the most recent catalog(s),
  2) click on “Areas of Study, and Course Descriptions,”
  3) click on “PDF of Entire Catalog” in upper right,
  4) press Ctrl F, and enter the prefix and number of the course(s) from this form.

  Non-licensure programs:

    Aquatic Biology Major
    Wetlands Ecology Emphasis

  Teacher Licensure programs: None

  Liberal Education: None

The above “service area” programs/departments were notified of this modification on ________ (date) by __________________ (mail, email, or phone).

NA – No other programs/departments are influenced by this drop.

Please check one of the items below:
______  No comments were received from other programs or departments within one week of the notification.

______  Comments were received within one week of the notification, and are attached.

**Reason(s) for dropping this course:**

Current faculty do not have room in their load to offer this course.
BSU Curriculum Forms

Form 5

Program Modification Form

Program to be modified: Aquatic Biology

List all proposed change(s):

- Increase GPA requirement to 2.50 for all three emphases within the Aquatic Biology major
- Drop BIOL 3554 Readings in Aquatic Biology (1 credit) from all three emphases in the Aquatic Biology major
- Drop GEOG 3231 Introduction to Geographic Information Systems (3 credits) from the ELECTIVE CORE COURSES within the Wetlands Ecology emphasis
- Drop BIOL 4031 Advanced Wetland Delineation (2 credits) from the Wetlands Ecology emphasis
- Add BIOL 3400 Fish & Wildlife Law and Administration (3 credits) as an option to the Elective Core Courses for the Fisheries Biology emphasis within the Aquatic Biology major
- Add GEOL 3212 Hydrogeology (3 credits) as an option to the core aquatic biology courses to be taken in place of CHEM 3150 Standard Methods of Water Analysis (3 credits) or GEOL 3211 Environmental Hydrology (3 credits)
- Change the name of BIOL 3362/5362 Stream and River Ecology (4 credits) to Streams and Rivers
- Drop BIOL 4898 Fisheries Research I (2 credits) and BIOL 4899 Fisheries Research II (2 credit) as capstone options for the Aquatic Systems and Wetlands Ecology emphases in the Aquatic Biology major
- Add STAT 3610 Time Series Analysis (3 credits) as an option within the statistics and math requirement section of the Fisheries Biology emphasis in the Aquatic Biology major
- Add GEOG 4265 Spatial Analysis (3 credits) as an option within the statistics and math requirement section of the Fisheries Biology emphasis in the Aquatic Biology major

Reason(s) for the change(s):

- Increase GPA requirement to 2.50 for all three emphases within the Aquatic Biology major
  - Students that graduate with a GPA below 2.50 are not competitive for employment/graduate school within the field of aquatic biology
- Drop BIOL 3554 Readings in Aquatic Biology (1 credit) from all three emphases in the Aquatic Biology major
The material covered in this course is now covered in other classes within each emphasis, additionally this will reduce the size of the major and provide students with an easier path to graduation.

• Drop GEOG 3231 Introduction to Geographic Information Systems (3 credits) from the ELECTIVE CORE COURSES within the Wetlands Ecology emphasis
  o GEOG 3231 Introduction to Geographic Information Systems is already in the Aquatic Biology core requirements. This was an error from our last round of curriculum changes that we would like to have fixed.
• Drop BIOL 4031 Advanced Wetland Delineation (2 credits) from the Wetlands Ecology emphasis
  o Current faculty do not have room in their load to teach this course.
• Add BIOL 3400 Fish & Wildlife Law and Administration (3 credits) as an option to the Elective Core Courses for the Fisheries Biology emphasis within the Aquatic Biology major
  o This course meets American Fisheries Society human dimensions requirement for certification as a Fisheries Biologist. By adding this course into the elective section students have more options to meet this requirement and therefore will have an easier time navigating schedule conflicts.
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  o Adding this course as an option will provide foundational knowledge related to hydrology or water chemistry we are aiming for with this requirement, while also offering a course in a different semester than GEOL 3211 Environmental Hydrology. This will ease scheduling conflicts for our students.
• Change the name of BIOL 3362/5362 Stream and River Ecology (4 credits) to Streams and Rivers
  o The new name would better reflect the content provided in the course.
• Drop BIOL 4898 Fisheries Research I (2 credits) and BIOL 4899 Fisheries Research II (2 credit) as capstone options for the Aquatic Systems and Wetlands Ecology emphases in the Aquatic Biology major
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  o Time series data is commonly analyzed in fisheries biology and therefore the course would be beneficial to our students. This will also allow for more flexibility with student scheduling.
• Add GEOG 4265 Spatial Analysis (3 credits) as an option within the statistics and math requirement section of the Fisheries Biology emphasis in the Aquatic Biology major
GIS is commonly used in fisheries biology and therefore the course would be beneficial to our students. This will also allow for more flexibility with student scheduling.

Note: In order to avoid hidden prerequisites, if a course is being dropped from this program (but not from the entire curriculum), please check for which remaining courses may include this dropped course as a prerequisite. Course prerequisites may be found in the online catalog (http://www.bemidjistate.edu/academics/catalog/). Remedies for hidden prerequisites may be found under Curriculum Forms at (http://www.bemidjistate.edu/faculty_staff/faculty_association/forms/).

Note: If a course from another department/program was either added to or dropped from this program, please notify the chair/coordinator of that course's department/program and indicate the following:
The course’s home department/program was notified of the addition or dropping of their course(s) on

Dr. Miriam Rio Sanchez - 21 Sept 2017 by email and in person.
Dr. Derek Webb and Dr. Jeff Ueland – 9 Nov 2017 by email.

Please check one of the items below:

_____ No comments were received from other programs or departments within one week of the notification.

__X____ Comments were received within one week of the notification, and are attached.

Dr. Miriam Rio Sanchez stated that she was in favor of the proposed addition of GEOL 3212 Hydrogeology as an option in core requirements of the Aquatic Biology major.

Note: If this is a joint program, the signatures of both department chairs (and both deans, if different colleges) must be provided.

Alert: Attach a copy of the current program showing the marked changes.
Please copy the current program from the online catalog (http://www.bemidjistate.edu/academics/catalog/) and paste it into Word. Then use either the Track Changes feature under Tools, or the underline and strikethrough Font feature under Format. (Please note that the Track Changes feature may be easily switched on and off by holding down the Ctrl+Shift+E keys.)
Aquatic Biology, B.S. major

Required Credits: 75 74
Required GPA: 2.25 2.50

I REQUIRED BIOLOGY CORE COURSES

COMPLETE THE FOLLOWING COURSES:

- BIOL 1211 Introductory Biology I (4 credits)
- BIOL 1212 Introductory Biology II (4 credits)
- BIOL 2360 Genetics (4 credits)
- BIOL 2610 General Ecology (3 credits)

II REQUIRED AQUATIC BIOLOGY CORE COURSES

COMPLETE THE FOLLOWING COURSES:

- BIOL 3361 Limnology (4 credits)
- BIOL 3362 Stream and River Ecology Streams and Rivers (4 credits)
- BIOL 3554 Readings in Aquatic Biology (1 credit)
- BIOL 3830 Aquatic Plants and Algae (4 credits)
- BIOL 4200 Freshwater Invertebrates (4 credits)
- BIOL 4534 Ichthyology (4 credits)
- CHEM 3150 Standard Methods of Water Analysis (3 credits)
  or GEOL 3211 Environmental Hydrology (3 credits)
  or GEOL 3212 Hydrogeology (3 credits)
- GEOG 3231 Introduction to Geographic Information Systems (3 credits)

III CAPSTONE PROJECT

CAPSTONE PROJECT The Aquatic Biology capstone project, completed in the senior year, provides a culminating experience that integrates the knowledge and skills learned in previous courses and applies them to a scholarly activity. Examples of capstone projects may include original research projects or internships with state and federal agencies. The capstone project must be designed or chosen by the student in consultation with a faculty mentor or advisor, who must approve the project before work begins. Students should consult with their faculty mentor or advisor before their senior year commences. All capstone projects will include a written and oral component. Specific capstone requirements vary by field of emphasis. Refer to requirements as listed in specific emphases. CHOOSE ONE OF THE FOLLOWING THREE OPTIONS:
COMPLETE THE FOLLOWING COURSE:

- BIOL 4894 Advanced Research Project I (2 credits)

COMPLETE THE FOLLOWING COURSE:

- BIOL 4895 Advanced Research Project II (2 credits)

COMPLETE THE FOLLOWING COURSE:

- BIOL 4898 Fisheries Research I (2 credits)

COMPLETE THE FOLLOWING COURSES:

- BIOL 4894 Advanced Research Project I (2 credits)
- BIOL 4895 Advanced Research Project II (2 credits)

COMPLETE THE FOLLOWING COURSES:

- BIOL 4898 Fisheries Research I (2 credits)
- BIOL 4899 Fisheries Research II (2 credits)

AQUATIC SYSTEMS EMPHASIS

REQUIRED CORE COURSES

COMPLETE THE FOLLOWING COURSE:

- BIOL 3850 Marine Biology (3 credits)

ELECTIVE CORE COURSES

SELECT A MINIMUM OF 9 CREDITS FROM THE FOLLOWING:

- BIOL 3310 Entomology (4 credits)
- BIOL 3420 Human Dimensions of Wildlife and Fisheries Management (3 credits)
- BIOL 3610 Principles of Wildlife Management (3 credits)
- BIOL 3630 Conservation Biology (3 credits)
  or GEOG 3630 Conservation Biology (3 credits)
- BIOL 3723 Ecosystem Ecology (3 credits)
- BIOL 4620 Evolution (3 credits)
• GEOG 3232 Intermediate Geographic Information Systems (3 credits)

ADDITIONAL ELECTIVES
SELECT AN ADDITIONAL 3-4 CREDITS OF BIOLOGY ELECTIVES
AT THE 3000 LEVEL OR ABOVE.

V REQUIRED COURSES IN RELATED FIELDS

COMPLETE THE FOLLOWING COURSES:

• CHEM 1111 General Chemistry I (4 credits)
  or CHEM 2211 Principles of Chemistry I (4 credits)
• CHEM 1112 General Chemistry II (4 credits)
  or CHEM 2212 Principles of Chemistry II (4 credits)
• STAT 2610 Applied Statistics (4 credits)
  or PSY 3401 Basic Statistics for Research (4 credits)

SELECT 1 OF THE FOLLOWING COURSES:

• PHYS 1101 General Physics I (4 credits)
• PHYS 2101 Physics I (5 credits)
Aquatic Biology, B.S. major

Required Credits: 74
Required GPA: 2.50

I REQUIRED BIOLOGY CORE COURSES

COMPLETE THE FOLLOWING COURSES:

- BIOL 1211 Introductory Biology I (4 credits)
- BIOL 1212 Introductory Biology II (4 credits)
- BIOL 2360 Genetics (4 credits)
- BIOL 2610 General Ecology (3 credits)

II REQUIRED AQUATIC BIOLOGY CORE COURSES

COMPLETE THE FOLLOWING COURSES:

- BIOL 3361 Limnology (4 credits)
- BIOL 3362 Streams and Rivers (4 credits)
- BIOL 3830 Aquatic Plants and Algae (4 credits)
- BIOL 4200 Freshwater Invertebrates (4 credits)
- BIOL 4534 Ichthyology (4 credits)
- CHEM 3150 Standard Methods of Water Analysis (3 credits)
  or GEOL 3211 Environmental Hydrology (3 credits)
  or GEOL 3212 Hydrogeology (3 credits)
- GEOG 3231 Introduction to Geographic Information Systems (3 credits)

III CAPSTONE PROJECT

CAPSTONE PROJECT The Aquatic Biology capstone project, completed in the senior year, provides a culminating experience that integrates the knowledge and skills learned in previous courses and applies them to a scholarly activity. Examples of capstone projects may include original research projects or internships with state and federal agencies. The capstone project must be designed or chosen by the student in consultation with a faculty mentor or advisor, who must approve the project before work begins. Students should consult with their faculty mentor or advisor before their senior year commences. All capstone projects will include a written and oral component. Specific
Capstone requirements vary by field of emphasis. Refer to requirements as listed in specific emphases. Choose one of the following three options:

**Complete the following course:**
- BIOL 4894 *Advanced Research Project I* (2 credits)

**Complete the following course:**
- BIOL 4895 *Advanced Research Project II* (2 credits)

**Complete the following courses:**
- BIOL 4894 *Advanced Research Project I* (2 credits)
- BIOL 4895 *Advanced Research Project II* (2 credits)

**Aquatic Systems Emphasis**

**Required Core Courses**
**Complete the following course:**
- BIOL 3850 *Marine Biology* (3 credits)

**Elective Core Courses**
**Select a minimum of 9 credits from the following:**
- BIOL 3310 *Entomology* (4 credits)
- BIOL 3420 *Human Dimensions of Wildlife and Fisheries Management* (3 credits)
- BIOL 3610 *Principles of Wildlife Management* (3 credits)
- BIOL 3630 *Conservation Biology* (3 credits)
  *or* GEOG 3630 *Conservation Biology* (3 credits)
- BIOL 3723 *Ecosystem Ecology* (3 credits)
- BIOL 4620 *Evolution* (3 credits)
- GEOG 3232 *Intermediate Geographic Information Systems* (3 credits)

**Additional Electives**
**Select an additional 3-4 credits of biology electives at the 3000 level or above.**
V REQUIRED COURSES IN RELATED FIELDS

COMPLETE THE FOLLOWING COURSES:

- CHEM 1111 General Chemistry I (4 credits)
  or CHEM 2211 Principles of Chemistry I (4 credits)
- CHEM 1112 General Chemistry II (4 credits)
  or CHEM 2212 Principles of Chemistry II (4 credits)
- STAT 2610 Applied Statistics (4 credits)
  or PSY 3401 Basic Statistics for Research (4 credits)

SELECT 1 OF THE FOLLOWING COURSES:

- PHYS 1101 General Physics I (4 credits)
- PHYS 2101 Physics I (5 credits)

SUGGESTED SEMESTER SCHEDULE FOR AQUATIC BIOLOGY MAJOR, B.S., AQUATIC SYSTEMS EMPHASIS

The following is a list of required Aquatic Biology Major, B.S., Aquatic Systems Emphasis courses arranged by year. This schedule is intended to assist students in planning their courses. There is some flexibility in this schedule, but graduation within four years will require close adherence to the specified sequence of courses. Always consult your academic advisor in Aquatic Biology as to the proper courses and sequence of courses needed for graduation.

Note: With proper student planning and in consultation with the Aquatic Biology academic advisor a student may complete his or her academic degree in 120 semester credits. It is possible, in some circumstances, that courses in a student's Liberal Education program may be used in his or her academic major.

Freshman

- BIOL 1211 Introductory Biology I (4 credits)
- BIOL 1212 Introductory Biology II (4 credits)
- CHEM 1111 General Chemistry I (4 credits)
  or CHEM 2211 Principles of Chemistry I (4 credits)
- CHEM 1112
  or CHEM 2212 Principles of Chemistry II (4 credits)
- Liberal Education Requirements
Sophomore

- BIOL 2360 **Genetics** (4 credits)
- BIOL 2610 **General Ecology** (3 credits)
- PHYS 1101 **General Physics I** (4 credits)
  or PHYS 2101 **Physics I** (5 credits)
- STAT 2610 **Applied Statistics** (4 credits)
  or PSY 3401 **Basic Statistics for Research** (4 credits)
- Liberal Education Requirements

Junior

- BIOL 3361 **Limnology** (4 credits)
- BIOL 3362 **Streams and Rivers** (4 credits)
- BIOL 3830 **Aquatic Plants and Algae** (4 credits)
- CHEM 3150 **Standard Methods of Water Analysis** (3 credits)
  or GEOL 3211 **Environmental Hydrology** (3 credits)
  or GEOL 3212 **Hydrogeology** (3 credits)
- Elective courses in field of emphasis
- Complete Liberal Education Requirements

Senior

- BIOL 4200 **Freshwater Invertebrates** (4 credits)
- BIOL 4534 **Ichthyology** (4 credits)
- GEOG 3231 **Introduction to Geographic Information Systems** (3 credits)
- Capstone Project
- Elective courses in field of emphasis
Aquatic Biology, B.S. major

Special Note: Students seeking fisheries certification through the American Fisheries Society are encouraged to carefully select their Liberal Education courses to include 9 credits from courses related to composition, technical writing and/or verbal communications.

Required Credits: 76    73
Required GPA: 2.25-2.50

I REQUIRED BIOLOGY CORE COURSES

COMPLETE THE FOLLOWING COURSES:

- BIOL 1211 Introductory Biology I (4 credits)
- BIOL 1212 Introductory Biology II (4 credits)
- BIOL 2360 Genetics (4 credits)
- BIOL 2610 General Ecology (3 credits)

II REQUIRED AQUATIC BIOLOGY CORE COURSES

COMPLETE THE FOLLOWING COURSES:

- BIOL 3361 Limnology (4 credits)
- BIOL 3362 Stream and River Ecology Streams and Rivers (4 credits)
- BIOL 3554 Readings in Aquatic Biology (1 credit)
- BIOL 3830 Aquatic Plants and Algae (4 credits)
- BIOL 4200 Freshwater Invertebrates (4 credits)
- BIOL 4534 Ichthyology (4 credits)
- CHEM 3150 Standard Methods of Water Analysis (3 credits)
  or GEOL 3211 Environmental Hydrology (3 credits)
  or GEOL 3212 Hydrogeology (3 credits)
- GEOG 3231 Introduction to Geographic Information Systems (3 credits)

III CAPSTONE PROJECT

CAPSTONE PROJECT The Aquatic Biology capstone project, completed in the senior year, provides a culminating experience that integrates the knowledge and skills learned in previous courses and applies them to a scholarly activity. Examples of capstone projects may include original research projects or internships with state and federal agencies. The capstone project must be designed or chosen by the student in consultation with a faculty mentor or advisor, who must approve the project before work begins.
Students should consult with their faculty mentor or advisor before their senior year commences. All capstone projects will include a written and oral component. Specific capstone requirements vary by field of emphasis. Refer to requirements as listed in specific emphases.

COMPLETE THE FOLLOWING COURSES:

- BIOL 4898 Fisheries Research I (2 credits)
- BIOL 4899 Fisheries Research II (2 credits)

FISHERIES BIOLOGY EMPHASIS

REQUIRED CORE COURSES

COMPLETE THE FOLLOWING COURSE:

- BIOL 4545 Fisheries Management (4 credits)

ELECTIVE CORE COURSES

SELECT A MINIMUM OF 6 CREDITS FROM THE FOLLOWING:

- BIOL 2339 Ethics of Fish and Wildlife Management (3 credits)
- BIOL 3400 Fish & Wildlife Law and Administration (3 credits)
- BIOL 3420 Human Dimensions of Wildlife and Fisheries Management (3 credits)
- ENVR 3040 Environmental Economics (3 credits)  
  or ECON 3040 Environmental Economics (3 credits)
- ENVR 4210 Environmental Law and Policy (3 credits)

V REQUIRED COURSES IN RELATED FIELDS

COMPLETE THE FOLLOWING COURSES:

- CHEM 1111 General Chemistry I (4 credits)  
  or CHEM 2211 Principles of Chemistry I (4 credits)
- CHEM 1112 General Chemistry II (4 credits)  
  or CHEM 2212 Principles of Chemistry II (4 credits)

SELECT 2 OF THE FOLLOWING COURSES:

- GEOG 4265 Spatial Analysis (3 credits)
- MATH 2471 Calculus I (5 credits)
- PSY 3401 Basic Statistics for Research (4 credits)
- PSY 4403 Advanced Statistics and Research Design (4 credits)
- STAT 2610 Applied Statistics (4 credits)
- STAT 3610 Time Series Analysis (3 credits)

SELECT 1 OF THE FOLLOWING COURSES:

- PHYS 1101 General Physics I (4 credits)
- PHYS 2101 Physics I (5 credits)
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Aquatic Biology, B.S. major

Special Note: Students seeking fisheries certification through the American Fisheries Society are encouraged to carefully select their Liberal Education courses to include 9 credits from courses related to composition, technical writing and/or verbal communications.

Required Credits: 73
Required GPA: 2.50

I REQUIRED BIOLOGY CORE COURSES

COMPLETE THE FOLLOWING COURSES:

- BIOL 1211 Introductory Biology I (4 credits)
- BIOL 1212 Introductory Biology II (4 credits)
- BIOL 2360 Genetics (4 credits)
- BIOL 2610 General Ecology (3 credits)

II REQUIRED AQUATIC BIOLOGY CORE COURSES

COMPLETE THE FOLLOWING COURSES:

- BIOL 3361 Limnology (4 credits)
- BIOL 3362 Streams and Rivers (4 credits)
- BIOL 3830 Aquatic Plants and Algae (4 credits)
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- BIOL 4534 Ichthyology (4 credits)
- CHEM 3150 Standard Methods of Water Analysis (3 credits)
  or GEOL 3211 Environmental Hydrology (3 credits)
  or GEOL 3212 Hydrogeology (3 credits)
- GEOG 3231 Introduction to Geographic Information Systems (3 credits)

III CAPSTONE PROJECT

CAPSTONE PROJECT The Aquatic Biology capstone project, completed in the senior year, provides a culminating experience that integrates the knowledge and skills learned in previous courses and applies them to a scholarly activity. Examples of capstone projects may include original research projects or internships with state and federal agencies.
agencies. The capstone project must be designed or chosen by the student in consultation with a faculty mentor or advisor, who must approve the project before work begins. Students should consult with their faculty mentor or advisor before their senior year commences. All capstone projects will include a written and oral component. Specific capstone requirements vary by field of emphasis. Refer to requirements as listed in specific emphases.

COMPLETE THE FOLLOWING COURSES:

- BIOL 4898 Fisheries Research I (2 credits)
- BIOL 4899 Fisheries Research II (2 credits)

FISHERIES BIOLOGY EMPHASIS

REQUIRED CORE COURSES
COMPLETE THE FOLLOWING COURSE:

- BIOL 4545 Fisheries Management (4 credits)

ELECTIVE CORE COURSES
SELECT A MINIMUM OF 6 CREDITS FROM THE FOLLOWING:

- BIOL 2339 Ethics of Fish and Wildlife Management (3 credits)
- BIOL 3420 Human Dimensions of Wildlife and Fisheries Management (3 credits)
- ENVR 3040 Environmental Economics (3 credits)
  or ECON 3040 Environmental Economics (3 credits)
- BIOL 3400 Fish & Wildlife Law and Administration (3 credits)
- ENVR 4210 Environmental Law and Policy (3 credits)

V REQUIRED COURSES IN RELATED FIELDS

COMPLETE THE FOLLOWING COURSES:

- CHEM 1111 General Chemistry I (4 credits)
  or CHEM 2211 Principles of Chemistry I (4 credits)
- CHEM 1112 General Chemistry II (4 credits)
  or CHEM 2212 Principles of Chemistry II (4 credits)

SELECT 2 OF THE FOLLOWING COURSES:

- GEOG 4265 Spatial Analysis (3 credits)
• MATH 2471 Calculus I (5 credits)
• PSY 3401 Basic Statistics for Research (4 credits)
• PSY 4403 Advanced Statistics and Research Design (4 credits)
• STAT 2610 Applied Statistics (4 credits)
• STAT 3610 Time Series Analysis (3 credits)

SELECT 1 OF THE FOLLOWING COURSES:

• PHYS 1101 General Physics I (4 credits)
• PHYS 2101 Physics I (5 credits)

SUGGESTED SEMESTER SCHEDULE FOR AQUATIC BIOLOGY MAJOR,
B.S., FISHERIES BIOLOGY EMPHASIS

Freshman

• BIOL 1211 Introductory Biology I (4 credits)
• BIOL 1212 Introductory Biology II (4 credits)
• CHEM 1111 General Chemistry I (4 credits)
  or CHEM 2211 Principles of Chemistry I (4 credits)
• CHEM 1112 General Chemistry II (4 credits)
  or CHEM 2212 Principles of Chemistry II (4 credits)
• Liberal Education Requirements

Sophomore

• BIOL 2360 Genetics (4 credits)
• BIOL 2610 General Ecology (3 credits)
• PHYS 1101 General Physics I (4 credits)
  or PHYS 2101 Physics I (5 credits)
• Liberal Education Requirements
• Math/Statistics Requirements

Junior

• BIOL 3361 Limnology (4 credits)
• BIOL 3362 Streams and Rivers (4 credits)
• BIOL 3830 Aquatic Plants and Algae (4 credits)
• BIOL 4200 Freshwater Invertebrates (4 credits)
• CHEM 3150 Standard Methods of Water Analysis (3 credits)
  or GEOL 3211 Environmental Hydrology (3 credits)
  or GEOL 3212 Hydrogeology (3 credits)
Elective courses in field of emphasis
Complete Liberal Education Requirements
Math/Statistics Requirements

Senior

- BIOL 4534 Ichthyology (4 credits)
- BIOL 4545 Fisheries Management (4 credits)
- BIOL 4898 Fisheries Research I (2 credits)
- BIOL 4899 Fisheries Research II (2 credits)
- GEOG 3231 Introduction to Geographic Information Systems (3 credits)
- Elective courses in field of emphasis
Aquatic Biology, B.S. major

Required Credits: 75 72
Required GPA: 2.25 2.50

I REQUIRED BIOLOGY CORE COURSES

COMPLETE THE FOLLOWING COURSES:

- BIOL 1211 Introductory Biology I (4 credits)
- BIOL 1212 Introductory Biology II (4 credits)
- BIOL 2360 Genetics (4 credits)
- BIOL 2610 General Ecology (3 credits)

II REQUIRED AQUATIC BIOLOGY CORE COURSES

COMPLETE THE FOLLOWING COURSES:

- BIOL 3361 Limnology (4 credits)
- BIOL 3362 Stream and River Ecology (4 credits)
- BIOL 3554 Readings in Aquatic Biology (1 credit)
- BIOL 3830 Aquatic Plants and Algae (4 credits)
- BIOL 4200 Freshwater Invertebrates (4 credits)
- BIOL 4534 Ichthyology (4 credits)
- CHEM 3150 Standard Methods of Water Analysis (3 credits)
  or GEOL 3211 Environmental Hydrology (3 credits)
  or GEOL 3212 Hydrogeology (3 credits)
- GEOG 3231 Introduction to Geographic Information Systems (3 credits)

III CAPSTONE PROJECT

CAPSTONE PROJECT The Aquatic Biology capstone project, completed in the senior year, provides a culminating experience that integrates the knowledge and skills learned in previous courses and applies them to a scholarly activity. Examples of capstone projects may include original research projects or internships with state and federal agencies. The capstone project must be designed or chosen by the student in consultation with a faculty mentor or advisor, who must approve the project before work begins. Students should consult with their faculty mentor or advisor before their senior year commences. All capstone projects will include a written and oral component. Specific capstone requirements vary by field of emphasis. Refer to requirements as listed in specific emphases. CHOOSE ONE OF THE FOLLOWING FIVE THREE OPTIONS:
COMPLETE THE FOLLOWING COURSE:

- BIOL 4894 Advanced Research Project I (2 credits)

COMPLETE THE FOLLOWING COURSE:

- BIOL 4895 Advanced Research Project II (2 credits)

COMPLETE THE FOLLOWING COURSE:

- BIOL 4898 Fisheries Research I (2 credits)

COMPLETE THE FOLLOWING COURSES:

- BIOL 4894 Advanced Research Project I (2 credits)
- BIOL 4895 Advanced Research Project II (2 credits)

COMPLETE THE FOLLOWING COURSES:

- BIOL 4898 Fisheries Research I (2 credits)
- BIOL 4899 Fisheries Research II (2 credits)

WETLANDS ECOLOGY EMPHASIS

REQUIRED CORE COURSES:

COMPLETE THE FOLLOWING COURSES:

- BIOL 3840 Wetlands Ecology (3 credits)
  * or ENVR 3840 Wetlands Ecology (3 credits)
- BIOL 3844 Wetlands Ecology Lab (1 credit)
- BIOL 4030 Wetland Delineation and Classification (3 credits)
  * BIOL 4031 Advanced Wetland Delineation (2 credits)

ELECTIVE CORE COURSES

SELECT A MINIMUM OF 6 CREDITS FROM THE FOLLOWING:

- BIOL 3120 Soils (4 credits)
  * or GEOL 3120 Soils (4 credits)
• BIOL 3420 **Human Dimensions of Wildlife and Fisheries Management** (3 credits)
  *or ENVR 4210 **Environmental Law and Policy** (3 credits)
• BIOL 3610 **Principles of Wildlife Management** (3 credits)
• BIOL 3630 **Conservation Biology** (3 credits)
  *or GEOG 3630 **Conservation Biology** (3 credits)
• BIOL 3723 **Ecosystem Ecology** (3 credits)
• BIOL 3850 **Marine Biology** (3 credits)
• GEOG 3231 **Introduction to Geographic Information Systems** (3 credits)
• GEOG 3232 **Intermediate Geographic Information Systems** (3 credits)

**V REQUIRED COURSES IN RELATED FIELDS**

COMPLETE THE FOLLOWING COURSES:

• CHEM 1111 **General Chemistry I** (4 credits)
  *or CHEM 2211 **Principles of Chemistry I** (4 credits)
• CHEM 1112 **General Chemistry II** (4 credits)
  *or CHEM 2212 **Principles of Chemistry II** (4 credits)
• STAT 2610 **Applied Statistics** (4 credits)
  *or PSY 3401 **Basic Statistics for Research** (4 credits)

**SELECT 1 OF THE FOLLOWING COURSES:**

• PHYS 1101 **General Physics I** (4 credits)
• PHYS 2101 **Physics I** (5 credits)
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Aquatic Biology, B.S. major

Required Credits: 72
Required GPA: 2.50

I REQUIRED BIOLOGY CORE COURSES

COMPLETE THE FOLLOWING COURSES:

• BIOL 1211 Introductory Biology I (4 credits)
• BIOL 1212 Introductory Biology II (4 credits)
• BIOL 2360 Genetics (4 credits)
• BIOL 2610 General Ecology (3 credits)

II REQUIRED AQUATIC BIOLOGY CORE COURSES

COMPLETE THE FOLLOWING COURSES:

• BIOL 3361 Limnology (4 credits)
• BIOL 3362 Streams and Rivers (4 credits)
• BIOL 3830 Aquatic Plants and Algae (4 credits)
• BIOL 4200 Freshwater Invertebrates (4 credits)
• BIOL 4534 Ichthyology (4 credits)
• CHEM 3150 Standard Methods of Water Analysis (3 credits)
  or GEOL 3211 Environmental Hydrology (3 credits)
  or GEOL 3212 Hydrogeology (3 credits)
• GEOG 3231 Introduction to Geographic Information Systems (3 credits)

III CAPSTONE PROJECT

CAPSTONE PROJECT The Aquatic Biology capstone project, completed in the senior year, provides a culminating experience that integrates the knowledge and skills learned in previous courses and applies them to a scholarly activity. Examples of capstone projects may include original research projects or internships with state and federal agencies. The capstone project must be designed or chosen by the student in consultation with a faculty mentor or advisor, who must approve the project before work begins. Students should consult with their faculty mentor or advisor before their senior year commences. All capstone projects will include a written and oral component. Specific
capstone requirements vary by field of emphasis. Refer to requirements as listed in specific emphases. CHOOSE ONE OF THE FOLLOWING THREE OPTIONS:

COMPLETE THE FOLLOWING COURSE:

- BIOL 4894 Advanced Research Project I (2 credits)

COMPLETE THE FOLLOWING COURSE:

- BIOL 4895 Advanced Research Project II (2 credits)

COMPLETE THE FOLLOWING COURSES:

- BIOL 4894 Advanced Research Project I (2 credits)
- BIOL 4895 Advanced Research Project II (2 credits)

WETLANDS ECOLOGY EMPHASIS

REQUIRED CORE COURSES:

COMPLETE THE FOLLOWING COURSES:

- BIOL 3840 Wetlands Ecology (3 credits)
  or ENVR 3840 Wetlands Ecology (3 credits)
- BIOL 3844 Wetlands Ecology Lab (1 credit)
- BIOL 4030 Wetland Delineation and Classification (3 credits)

ELECTIVE CORE COURSES

SELECT A MINIMUM OF 6 CREDITS FROM THE FOLLOWING:

- BIOL 3120 Soils (4 credits)
  or GEOL 3120 Soils (4 credits)
- BIOL 3420 Human Dimensions of Wildlife and Fisheries Management (3 credits)
  or ENVR 4210 Environmental Law and Policy (3 credits)
- BIOL 3610 Principles of Wildlife Management (3 credits)
- BIOL 3630 Conservation Biology (3 credits)
  or GEOG 3630 Conservation Biology (3 credits)
- BIOL 3723 Ecosystem Ecology (3 credits)
- BIOL 3850 Marine Biology (3 credits)
- GEOG 3232 Intermediate Geographic Information Systems (3 credits)
V REQUIRED COURSES IN RELATED FIELDS

COMPLETE THE FOLLOWING COURSES:

- CHEM 1111 General Chemistry I (4 credits)
  or CHEM 2211 Principles of Chemistry I (4 credits)
- CHEM 1112 General Chemistry II (4 credits)
  or CHEM 2212 Principles of Chemistry II (4 credits)
- STAT 2610 Applied Statistics (4 credits)
  or PSY 3401 Basic Statistics for Research (4 credits)

SELECT 1 OF THE FOLLOWING COURSES:

- PHYS 1101 General Physics I (4 credits)
- PHYS 2101 Physics I (5 credits)

SUGGESTED SEMESTER SCHEDULE FOR AQUATIC BIOLOGY MAJOR, B.S., WETLANDS EMPHASIS

The following is a list of required Aquatic Biology Major, B.S., Wetlands Emphasis courses arranged by year. This schedule is intended to assist students in planning their courses. There is some flexibility in this schedule, but graduation within four years will require close adherence to the specified sequence of courses. Always consult your academic advisor in Aquatic Biology as to the proper courses and sequence of courses needed for graduation.

Note: With proper student planning and in consultation with the Aquatic Biology academic advisor a student may complete his or her academic degree in 120 semester credits. It is possible, in some circumstances, that courses in a student's Liberal Education program may be used in his or her academic major.

Freshman

- BIOL 1211 Introductory Biology I (4 credits)
- BIOL 1212 Introductory Biology II (4 credits)
- CHEM 1111 General Chemistry I (4 credits)
  or CHEM 2211 Principles of Chemistry I (4 credits)
- CHEM 1112 General Chemistry II (4 credits)
  or CHEM 2212 Principles of Chemistry II (4 credits)
• Liberal Education requirements

Sophomore

• BIOL 2360 Genetics (4 credits)
• BIOL 2610 General Ecology (3 credits)
• PHYS 1101 General Physics I (4 credits)
  or PHYS 2101 Physics I (5 credits)
• STAT 2610 Applied Statistics (4 credits)
  or PSY 3401 Basic Statistics for Research (4 credits)
• Liberal Education requirements

Junior

• BIOL 3361 Limnology (4 credits)
• BIOL 3362 Streams and Rivers (4 credits)
• BIOL 3830 Aquatic Plants and Algae (4 credits)
• BIOL 4030 Wetland Delineation and Classification (3 credits)
• CHEM 3150 Standard Methods of Water Analysis (3 credits)
  or GEOL 3211 Environmental Hydrology (3 credits)
  or GEOL 3212 Hydrogeology (3 credits)
• Complete Liberal Education requirements
• Elective courses in field of emphasis

Senior

• BIOL 3840 Wetlands Ecology (3 credits)
  or ENVR 3840 Wetlands Ecology (3 credits)
• BIOL 3844 Wetlands Ecology Lab (1 credit)
• BIOL 4200 Freshwater Invertebrates (4 credits)
• GEOG 3231 Introduction to Geographic Information Systems (3 credits)
• Capstone Project
• Elective courses in field of emphasis
BSU Curriculum Forms

Form 8
Updated: 09.18.15

Signatures

Andrew Hafs / Associate Professor / 11.06.2017
Proposer / Title / Date

Elizabeth Rave / Biology Department Chair / 11.06.2017
Chair or Director / Department or Program / Date
Note: "All departmental recommendations [on curriculum] must be reviewed and approved by the department's faculty." -- IFO/MnSCU Master Agreement 2009-2011, 20.A.3 (p. 80).

At this point, packet goes to Records Office/Curriculum Coordinator to be logged in to the Curriculum Proposal Progress Grid.

Colleen Greer / Dean of College of Arts and Sciences / 12.05.2017
Dean / College / Date

Note: If proposal is sent back to the Proposer, please notify the Curriculum Coordinator. If approved, packet goes to Academic Affairs Office.
Hello Andy, we just had a department meeting and the department is fine with your proposal. The department also wanted to point out that if you have a student who completes the Time Series class along with prerequisites, of which calculus is one, then that student would not have much more coursework necessary in order to obtain a minor in mathematics. This might be advantageous for students with an eye on graduate school.

Derek

Dr. Derek Webb
Professor of Statistics and Mathematics
Department Chair
Bemidji State University Faculty Association President
Department of Mathematics and Computer Science
Bemidji State University
304 Hagg Sauer Hall
1500 Birchmont Dr. NE 23
Bemidji, MN 56601-2699

Office: 218-755-2846
Fax: 218-755-2822
email: dwebb@bemidjistate.edu

Andy,

That is fine with me. If it is not part of another area of your curriculum you might also consider the spatial analysis class (geog 4365/5365) in that area too.

best - jeff ueland

Jeffrey S. Ueland, Ph.D.
Associate Professor and Chair
Hi Derek and Jeff,

I would like to add Time Series Analysis as an option within the math/statistics requirements section of the Fisheries Biology Emphasis of the aquatic biology major. Below is how the section currently reads. For certification purposes the students need either a stats course and calculus or two stats courses. Below is how the section currently reads.

SELECT 2 OF THE FOLLOWING COURSES:

- MATH 2471 Calculus I (5 credits)
- PSY 3401 Basic Statistics for Research (4 credits)
- PSY 4403 Advanced Statistics and Research Design (4 credits)
- STAT 2610 Applied Statistics (4 credits)

Time series data is commonly analyzed in fisheries biology and therefor the course would be beneficial to our students. This will also allow for more flexibility with student scheduling.

Either of you have an issues with this???

Thanks,

Andy

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