# Curriculum Proposal

**BIOL 15-16 #10**

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## Course Modifications

| 1.4 BIOL 3361/5361 Limnology I (4 credits) to Limnology; prerequisite change |
| 1.6 BIOL 3362/5362 Limnology II (4 credits) to Stream and River Ecology; description and prerequisite change |
| 1.8 BIOL 3830/5830 Aquatic Plants (4 credits) to Aquatic Plants and Algae; description |

## New Courses

| 1.10 BIOL 4898 Fisheries Research I (2 credits) |
| 1.14 BIOL 4899 Fisheries Research II (2 credits) |

## Program Modification

| 1.18 Aquatic Biology, B.S., Aquatic Systems Emphasis |
| 1.18 Aquatic Biology, B.S., Fisheries Biology Emphasis |
| 1.18 Aquatic Biology, B.S., Wetlands Ecology Emphasis |

| 1.43 Signatures |
BSU Curriculum Forms

Form 1

Curriculum Modification Summary

College: College of Arts and Sciences

Department: Biology

Proposers: Richard Koch, Debbie Guelda and Andrew Hafs

Proposer’s position: 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.):

1. Course modifications.
   BIOL 3361 Limnology I (4 credits) / BIOL 5361 Limnology I (4 credits) - Proposed name change to more closely match current course content
   BIOL 3362 Limnology II (4 credits) / BIOL 5362 Limnology II (4 credits) - Proposed name, description and prerequisite change to more closely match current course content.
   BIOL 3830 Aquatic Plants (4 credits) / BIOL 5830 Aquatic Plants (4 credits) - Proposed name change to more closely match current course content.

2. New courses.
   BIOL 4898 Fisheries Research I (2 credits) and BIOL 4899 Fisheries Research II (2 credits) to focus capstone research on fish within the Fisheries Emphasis of Aquatic Biology, B.S.

3. Program modifications to Aquatic Biology, B.S. major and its 3 emphases to better prepare our students for careers and advanced education opportunities in the aquatics fields.

Aquatic Biology, B.S. (all emphases)

Add choice of CHEM 3150 Standard Methods of Water Analysis (3 credits) OR GEOL 3211 Environmental Hydrology (3 credits) to encourage additional education in water chemistry and hydrology for all Aquatic Biology B.S. majors

Add BIOL 4534 Ichthyology (4 credits) to the required core to ensure additional education in fish taxonomy for all Aquatic Biology B.S. majors.

Add GEOG 3231 Introduction to Geographic Information Systems (3 credits) to the required core to ensure education in Geographic Information Systems for all Aquatic Biology, B.S. majors. Such experience is crucial for career placement.

Drop BIOL 2620 Field and Laboratory Projects in Ecological Research (2 credits). We have incorporated student research projects into several of our core courses, so the requirement of BIOL 2620 Field Laboratory Projects in Ecological Research (2 credits) is no longer necessary.

Revise Capstone Requirements. Will vary by emphases within this major.
Aquatic Systems Emphasis
- Required Core: Add BIOL 3850 Marine Biology (3 credits) to provide focus on marine systems. Remove BIOL 4534 Ichthyology (4 credits) (moved to required core for major)
- Elective Core: (altered to better meet educational focus of this emphasis)
  - Drop BIOL 3850 Marine Biology (3 credits), CHEM 3150 Standard Methods of Water Analysis (3 credits), GEOG 3231 Introduction to Geographic Information Systems (3 credits) as these are now listed in required core
  - Add BIOL 3420 Human Dimensions in Wildlife and Fisheries (3 credits) and GEOG 3232 Intermediate Geographic Information Systems (3 credits) as optional electives
- Capstone Project modified to ensure students complete 2-4 credits in either supervised internship or advanced research.
- Required courses in related fields:
  - Include CHEM 1111 General Chemistry I (4 credits) and CHEM 1112 General Chemistry II (4 credits) as alternatives to CHEM 2211 Principles of Chemistry I (4 credits) and CHEM 2212 Principles of Chemistry II (4 credits), respectively.
  - Drop requirement of PHYS 1102 General Physics II (4 credits) or PHYS 2102 Physics II (5 credits). Though both are good courses, this drop is necessary to clear credits for additional specialty courses.

Fisheries Biology Emphasis
- Required Core:
  - Drop BIOL 4534 Ichthyology (4 credits) since now listed as required core for major
- Elective Core: (altered to better meet educational focus of this emphasis)
  - Drop CHEM 3150 Standard Methods of Water Analysis (3 credits) since now listed as required core in this major
  - Drop BIOL 3150 Animal Behavior (3 credits), BIOL 4210 Parasitology (4 credits), BIOL 4620 Evolution (3 credits) from elective options.
  - Add BIOL 2339 Ethics of Fish and Wildlife Management (3 credits), BIOL 3850 Marine Biology (3 credits), BIOL 3420 Human Dimensions of Wildlife and Fisheries Management (3 credits), BIOL 3610 Principles of Wildlife Management (3 credits) as elective options.
- Capstone Project modified to require the new courses BIOL 4898 Fisheries Research I (2 credits) and 4899 Fisheries Research II (2 credits) to ensure students complete 4 credits of fisheries specific research.
- Required courses in related fields:
  - Include CHEM 1111 General Chemistry I (4 credits) and CHEM 1112 General Chemistry II (4 credits) as alternatives to CHEM 2211 Principles of Chemistry I (4 credits) and CHEM 2212 Principles of Chemistry II (4 credits), respectively.
  - Drop requirement of PHYS 1102 General Physics II (4 credits) or PHYS 2102 Physics II (5 credits)
Wetlands Ecology Emphasis

- Required Core:
  - Add BIOL 4031 Advanced Wetland Delineation (2 credits) to provide advanced training in this sub-discipline.

- Elective Core: (altered to better meet educational focus of this emphasis)
  - Drop CHEM 3150 Standard Methods of Water Analysis (3 credits) and GEOL 3211 Environmental Hydrology (3 credits), since now required for core in this major.
  - Drop BIOL 4031 Advanced Wetland Delineation (2 credits) since this course now proposed requirement in Required Core of this emphasis.
  - Add BIOL 3420 Human Dimensions in Wildlife and Fisheries (3 credits) as an “or” course to ENVR 4210 Environmental Law and Policy (3 credits), Add BIOL 3610 Principles of Wildlife Management (3 credits), GEOG 3231 Introduction to Geographic information Systems (3 credits) and GEOG 3232 Intermediate Geographic Information Systems (3 credits) as elective options.

- Capstone Project modified to ensure students complete 2-4 credits in either supervised internship or advanced research.

- Required courses in related fields:
  - Include CHEM 1111 General Chemistry I (4 credits) and CHEM 1112 General Chemistry II (4 credits) as alternatives to CHEM 2211 Principles of Chemistry I (4 credits) and CHEM 2212 Principles of Chemistry II (4 credits), respectively.
  - Drop requirement of PHYS 1102 General Physics I (1 credits) or PHYS 2102 Physics II (5 credits)

Modifications proposed (specify number of each):

- Course Modification(s) (form 2)  __3__
- New Course(s) (form 3)  __2__
- Course Drop(s) (form 4)  ____
- Program Modification(s) (form 5)  ____
- New Program(s) (form 6)  ____
- Program Drop(s) (form 7)  ____

The modifications affect (check):

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

Form 2

Course Modification Form

Current Course Number(s):
  Undergraduate: BIOL 3361
  Graduate: BIOL 5361
Proposed Course Number(s), if different:
  Undergraduate:
  Graduate:

Current Course Title: Limnology I
Proposed Course Title, if different: Limnology

Current Course Description: Introduction to the biology, chemistry, geology, and physics of lakes and streams. Lecture, field, and laboratory work. Prerequisites: BIOL 1211, BIOL 1212, BIOL 2610, CHEM 2211, CHEM 2212, and PHYS 1101 (concurrent enrollment possible), or consent of instructor.

Proposed Course Description, if different:

Current Credits: 4
Proposed Credits, if different:

Current Prerequisite(s):
  BIOL 3361: BIOL 1211, BIOL 1212, BIOL 2610, CHEM 2211, CHEM 2212, and PHYS 1101 (concurrent enrollment possible), or consent of instructor.
  BIOL 5361: None

Proposed Prerequisite(s), if different:
  BIOL 3361: BIOL 1211, BIOL 1212, BIOL 2610, CHEM 1111 or CHEM 2211, CHEM 1112 or CHEM 2212, or consent of instructor
  BIOL 5361: None

1) Reason(s) for change(s): Course name change to better reflect the content of the course. Proposed changes in this packet include the renaming of ‘Limnology II’ to ‘River and Stream Ecology’. With the removal of Limnology II course name, the dropping of the ‘I’ in ‘Limnology I’ is justified.

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: $
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/](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: Aquatic Biology, B.S.; Biology, B.S.; Biology minor; Wetlands Ecology minor;

Teacher Licensure programs: Science Education, B.S. *major*, Life Science Specialty

Liberal Education:

The above “service area” programs/departments were notified of this modification on _1 Sept 2014_ (date) by ___email and phone_______ (mail, email, or phone).

Please check one of the items below:

- _X__ 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 2

Course Modification Form

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

Current Course Title:  Limnology II
Proposed Course Title, if different:  Stream and River Ecology

Current Course Description:  The second course of the Limnology sequence concentrating on the organisms commonly found in aquatic systems. Topics include physical, chemical, and biotic constraints of aquatic biota with an emphasis on ecological relationships within and between groups. Lecture and laboratory. Prerequisite: BIOL 3361.

Proposed Course Description, if different:  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. Prerequisites: BIOL 1211 and BIOL 1212

Current Credits:  4
Proposed Credits, if different:  N/A

Current Prerequisite(s):
  BIOL 3362:  BIOL 3361
  BIOL 5362:  NONE
Proposed Prerequisite(s), if different:
  BIOL 3362:  BIOL 1211 and BIOL 1212
  BIOL 5362:  NONE

1)  Reason(s) for change(s): Proposed name and description change more closely matches current course content

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
   for:
   Proposed Course fee(s) per student, if different: $  N/A
   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: N/A
   Teacher Licensure programs: N/A
   Liberal Education:  N/A

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

   Please check one of the items below:

   __ N/A ___  No comments were received from other programs or departments within one week
   of the notification.

   ___ N/A ___  Comments were received within one week of the notification, and are attached.
BSU Curriculum Forms

Form 2

Course Modification Form

Current Course Number(s):
  Undergraduate: BIOL 3830
  Graduate: BIOL 5830
Proposed Course Number(s), if different:
  Undergraduate: 
  Graduate: 

Current Course Title: Aquatic Plants
Proposed Course Title, if different: Aquatic Plants and Algae

Current Course Description: Survey of the morphology, physiology, taxonomy, systematics, and ecology of algae and aquatic vascular plants. Lecture, laboratory, and field study. Prerequisites: BIOL 1211 and BIOL 1212

Proposed Course Description, if different:

Current Credits: 4
Proposed Credits, if different:

Current Prerequisite(s): BIOL 3830: BIOL 1211 and BIOL 1212
BIOL 5830: None

Proposed Prerequisite(s), if different:

1) Reason(s) for change(s): Course name change to better reflect the content of the course. Course covers aquatic plants AND algae. The name should reflect this. Algae are NOT plants.

2) May this modified course replace the current course for students remaining in the old curriculum? Yes ___ 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 ___
   - Major Content Areas: Yes ____ No ___
   - Projected Maximum Class Size (Cap): Yes ____ No ___

4) Current Course fee(s) per student: $
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: Aquatic Biology, B.S.; Biology, B.S.; Biology minor; Wetlands Ecology minor;

Teacher Licensure programs: Science Education, B.S. major, Life Science Specialty

Liberal Education:

The above “service area” programs/departments were notified of this modification on 1 Sept 2014 (date) by mail, email, or phone.

Please check one of the items below:

__X__ 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 3

New Course Form

Course Number: BIOL 4898
   Undergraduate: BIOL 4898
   Graduate: NA

Course Title: Fisheries Research I

Course Description: Independent field projects based on the background and interests of the students and the instructor. Designed to give students experience developing original research objectives, designing methods, collecting data, and writing a research manuscript that conveys that research to their peers.

Credits: 2

Prerequisite(s): Completion of the Area II required writing course for the B.S. or B.A. Biology major, junior status and consent of instructor.

1. Reason(s) for creating this course: This class would replace the current advanced projects course for the fisheries emphasis. This would force all students in the fisheries emphasis to do their capstone experience with the Dr. Andrew Hafs, the fisheries professor.

2. How often will this course be offered? Every fall semester

3. What are the student learning outcomes for the course (please precede each outcome with "Students will...")?
   1. Students will learn how to develop sound scientific research objective in the field of fisheries.
   2. Students will learn how to develop methods that are capable of testing objectives.
   3. Students will learn how to collect quality data in order to test objectives.
   4. Students will gain experience writing scientific manuscripts.

4. What are the major content areas for the course?

Lecture topics would include:

   Study design.
   How to write a manuscript.
   Creating figures for a manuscript vs a PowerPoint presentation.
   How to analyze data.
   How to create a good PowerPoint presentation.
   How to create a poster for a professional meeting.
   Publication process.
5. Is this course repeatable for credit, and if so, what is the maximum number of credits that can be earned?
Not repeatable for credit.

6. If this course is intended primarily for off-campus delivery (not offered on campus), what delivery mechanism will be used?
On campus delivery.

7. What is the projected maximum class size (cap)?
12

8. What qualified faculty will be available to teach this course?
Andrew W. Hafs, Ph.D.
Assistant Professor of Aquatic Biology
Bemidji State University

Ph.D., Fisheries and Wildlife Resources, West Virginia University, 2011
Dissertation Title: Bioelectrical Impedance Analysis Methods for Prediction of Brook Trout
Salvelinus fontinalis Percent Dry Weight

M.S., Fisheries and Wildlife Science, Arkansas Tech University, 2007
Thesis Title: Smallmouth Bass Survival, Movement, and Habitat Use in Response to Seasonally
Discontinuous Surface Flow.

B.S., Double major in Water Resources and Biology, University of Wisconsin at Stevens Point, 2005

NOTE WELL: Department and dean, in approving this proposal, attest both to the adequacy of
the qualifications of faculty here named, and to their availability to teach the course at the
frequency specified above, without excessive overload or disruption to other curriculum.

9. What additional library and other resources need or should be provided for this course, that are not already available?
None.

10. What special personal property or service fee(s) would be charged to students taking this course? These charges would be for 1) items that are retained by the student and have an educational or personal value beyond the classroom, or 2) services that are on the student’s behalf (see MnSCU Board Policy 5.11).
Amount per student: $0
For: NA

11. Attach a sample syllabus for the course. Note: if this course is double-numbered (u-grad/grad), the syllabus must include an additional component for graduate students.
Fisheries Research I - BIOL 4898

Andrew W. Hafs, Ph.D.
Assistant Professor of Aquatic Biology
Sattgast 218A
Bemidji State University
ahafs@bemidjistate.edu

Prerequisites: Completion of the Area II required writing course for the B.S. or B.A. Biology major, junior status and consent of instructor.

Course Description and Objectives: Independent field projects based on the background and interests of the students and the instructor. Designed to give students experience developing original research objectives, designing methods, collecting data, and writing a research manuscript that conveys that research to their peers.

Student Learning Outcomes for the Course:
1. Students will learn how to develop sound scientific research objective in the field of fisheries.
2. Students will learn how to develop methods that are capable of testing objectives.
3. Students will learn how to collect quality data in order to test objectives.
4. Students will gain experience writing scientific manuscripts.

Grading:

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<td>Weekly meetings</td>
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<th>Lab Week</th>
<th>Meeting Y/N</th>
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<td>8/25</td>
<td>Syllabus</td>
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<td>Development of Objectives</td>
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<td>Data collection</td>
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<tr>
<td>12/8</td>
<td>Data collection</td>
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<tr>
<td>12/15</td>
<td>Final Paper Due 12/17</td>
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</table>
Class policy with regard to plagiarism conforms to the university policy on such matters. At a minimum, plagiarism will result in a failing grade for the course.

This syllabus is a tentative plan that may need to be altered as the semester progresses.

**Students with Special Needs:**

We would like to make sure that all the materials, discussions and activities that are part of the course are accessible to you. If you would like to request accommodations or other services, please forward your request as soon as possible. It is possible to contact Disability Services, Bangsberg Hall, 101. Phone: 218/755-3883 or E-mail address Disabilityservices@bemidjistate.edu. Also available through the Minnesota Relay Service at 1-800-627-3529.
BSU Curriculum Forms

Form 3

New Course Form

Course Number: BIOL 4899
  Undergraduate: BIOL 4899
  Graduate: NA

Course Title: Fisheries Research II

Course Description: This course is a continuation of BIOL 4898. It is designed to give students experience analyzing data, drawing conclusions, completing and preparing a research manuscript for publication, and developing an oral presentation for a professional meeting.

Credits: 2

Prerequisite(s): BIOL 4898, Completion of the Area II required writing course for the B.S. or B.A. Biology major, junior status and consent of instructor.

1. Reason(s) for creating this course: This class would replace the current advanced projects course for the fisheries emphasis. This would force all students in the fisheries emphasis to do their capstone experience with the Dr. Andrew Hafs, the fisheries professor. Second part of a two semester capstone experience.

2. How often will this course be offered? Every spring semester

3. What are the student learning outcomes for the course (please precede each outcome with "Students will...")?

   1. Students will learn how to analyze data.
   2. Students will learn how draw conclusions from data they collected.
   3. Students will learn how to present their findings to their peers in the form of an oral presentation.
   4. Students will learn how to prepare a manuscript for publication.

4. What are the major content areas for the course?

   Lecture topics would include:

   Study design.
   How to write a manuscript.
   Creating figures for a manuscript vs a PowerPoint presentation.
   How to analyze data.
   How to create a good PowerPoint presentation.
   How to create a poster for a professional meeting.
   Publication process.

5. Is this course repeatable for credit, and if so, what is the maximum number of credits that can be earned?
Not repeatable for credit.

6. If this course is intended primarily for off-campus delivery (not offered on campus), what delivery mechanism will be used?
On campus delivery.

7. What is the projected maximum class size (cap)?
12

8. What qualified faculty will be available to teach this course?
Andrew W. Hafs, Ph.D.
Assistant Professor of Aquatic Biology
Bemidji State University
Ph.D., Fisheries and Wildlife Resources, West Virginia University, 2011
   Dissertation Title: Bioelectrical Impedance Analysis Methods for Prediction of Brook Trout
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   Discontinuous Surface Flow.
B.S., Double major in Water Resources and Biology, University of Wisconsin at Stevens Point, 2005

NOTE WELL: Department and dean, in approving this proposal, attest both to the adequacy of
the qualifications of faculty here named, and to their availability to teach the course at the
frequency specified above, without excessive overload or disruption to other curriculum.

9. What additional library and other resources need or should be provided for this course, that are
not already available?
None.

10. What special personal property or service fee(s) would be charged to students taking this
course? These charges would be for 1) items that are retained by the student and have an
educational or personal value beyond the classroom, or 2) services that are on the student’s
behalf (see MnSCU Board Policy 5.11).
   Amount per student: $0
   For: NA
11. Attach a sample syllabus for the course. Note: if this course is double-numbered (u-
grad/grad), the syllabus must include an additional component for graduate students.
Fisheries Research II - BIOL 4899

Andrew W. Hafs, Ph.D.
Assistant Professor of Aquatic Biology
Sattgast 218A
Bemidji State University
ahafs@bemidjistate.edu

Prerequisites: BIOL 4898, completion of the Area II required writing course for the B.S. or B.A. Biology major, junior status and consent of instructor.

Course Description and Objectives: This course is a continuation of BIOL 4898. It is designed to give students experience analyzing data, drawing conclusions, completing and preparing a research manuscript for publication, and developing an oral presentation for a professional meeting.

Student Learning Outcomes for the Course:
1. Students will learn how to analyze data.
2. Students will learn how to draw conclusions from data they collected.
3. Students will learn how to present their findings to their peers in the form of an oral presentation.
4. Students will learn how to prepare a manuscript for publication.

Grading:

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Lab Week        | Topic                                      |
----------------|--------------------------------------------|
1/14            | Syllabus                                   |
1/21            | Class expectations                         |
1/28            | Manuscript format                          |
2/4             | Data analysis                              |
2/11            | Creating figures for manuscript and presentations |
2/18            | Presenting at professional meetings        |
2/25            | Creating a poster for a professional meeting |
3/4             | Prep for student achievement conference    |
3/11            | Spring Break                               |
3/18            | In class revisions of first draft          |
3/25            | In class revisions of first draft          |
4/1             | Publication process                        |
4/8             | Student achievement week                   |
4/15            | Work on final drafts                       |
4/22            | Work on final drafts                       |
4/29            | Final Paper Due 4/29                       |

Class policy with regard to plagiarism conforms to the university policy on such matters. At a minimum, plagiarism will result in a failing grade for the course.

This syllabus is a tentative plan that may need to be altered as the semester progresses.
**Students with Special Needs:**
We would like to make sure that all the materials, discussions and activities that are part of the course are accessible to you. If you would like to request accommodations or other services, please forward your request as soon as possible. It is possible to contact Disability Services, Bangsberg Hall, 101. Phone: 218/755-3883 or E-mail address Disabilityservices@bemidjistate.edu. Also available through the Minnesota Relay Service at 1-800-627-3529.
BSU Curriculum Forms

Form 5

Program Modification Form

Program to be modified: Aquatic Biology B.S., Aquatic Systems emphasis
Aquatic Biology B.S., Fisheries Biology emphasis
Aquatic Biology B.S., Wetlands Ecology emphasis

List all proposed change(s):

Aquatic Biology B.S.,
- Add the following 3 courses to the Required Aquatic Biology Core courses: CHEM 3150 Standard Methods of Water Analysis (3 credits); GEOL 3211 Environmental Hydrology (3 credits); BIOL 4534 Ichthyology (4 credits).
- Remove BIOL 2620 (Field and Lab Projects in Ecological Research) from Required Aquatic Biology Core.
- Modify courses:
  - BIOL 3830 name change from ‘Aquatic Plants’ to ‘Aquatic Plants and Algae’
  - BIOL 3361 name change from ‘Limnology I’ to ‘Limnology’
  - BIOL 3362 name change from ‘Limnology II’ to ‘Stream and River Ecology’. This change also accompanied by change in course description and prerequisites to better reflect current course content.
- Revise Capstone Requirements. Will vary by emphases within this major.

Aquatic Systems emphasis
- Remove BIOL 4534 Ichthyology (4 credits) from required core. This course now required core for Aquatic Biology B.S.
- Remove CHEM 3150 Standard Methods of Water Analysis (3 credits); This course now required core for Aquatic Biology B.S.
- Add BIOL 3610 Principles Wildlife Management (3 credits) and BIOL 3420 Human Dimensions in Wildlife and Fisheries (3 credits) to Elective Core.
- Revise Capstone Experience to include 1 of 5 options:
  1) BIOL 4894 Advanced Research Project I (2 credits)
  2) BIOL 4895 Advanced Research Project II (2 credits)
  3) BIOL 4898 Fisheries Research I (2 credits)
  4) BIOL 4894 Advanced Research Project I (2 credits) and BIOL 4895 Advanced Research Project II (2 credits)
  5) BIOL 4898 Fisheries Research I (2 credits) and BIOL 4899 Fisheries Research II (2 credits)
• Include CHEM 1111 General Chemistry I and CHEM 1112 General Chemistry II as alternatives to CHEM 2211 Principles of Chemistry I and CHEM 2212 (Principles of Chemistry II, respectively).
• Drop PHYS 1102 General Physics II (4 credits) and PHYS 2102 Physics II (5 credits) from Required Courses in Related Fields.

**Fisheries Biology emphasis**

• Remove BIOL 4534 Ichthyology (4 credits) from required core. This course now required core for Aquatic Biology B.S.
• Remove CHEM 3150 Standard Methods of Water Analysis (3 credits) from Elective Core. This course now required core for Aquatic Biology B.S.
• Add BIOL 3610 Principles Wildlife Management (3 credits) and BIOL 3420 Human Dimensions in Wildlife and Fisheries (3 credits) to Elective Core.
• Revise Capstone Experience to require:
  1) BIOL 4898 Fisheries Research I (2 credits)
     and BIOL 4899 Fisheries Research II (2 credits)
• Include CHEM 1111 General Chemistry I (4 credits) and CHEM 1112 General Chemistry II (4 credits) as alternatives to CHEM 2211 Principles of Chemistry I (4 credits) and CHEM 2212 Principles of Chemistry II (4 credits), respectively.
• Drop PHYS 1102 General Physics II (4 credits) and PHYS 2102 Physics II (5 credits) from Required Courses in Related Fields.

**Wetlands Ecology emphasis**:

• Add BIOL 4031 Advanced Wetland Delineation (2 credits) to the Required Core courses, remove as Elective Core option.
• Change Elective Core Courses credit requirements from 8 to 6 credits
• Remove CHEM 3150 Standard Methods of Water Analysis (3 credits) from Elective Core. This course now required core for all Aquatic Biology B.S.
• Add BIOL 3610 Principles Wildlife Management (3 credits) and BIOL 3420 Human Dimensions in Wildlife and Fisheries (3 credits) to Elective Core course options.
• Revise Capstone Experience to include 1 of 5 options:
  1) BIOL 4894 Advanced Research Project I (2 credits)
  2) BIOL 4895 Advanced Research Project II (2 credits)
  3) BIOL 4898 Fisheries Research I (2 credits)
  4) BIOL 4894 Advanced Research Project I (2 credits)
     and BIOL 4895 Advanced Research Project II (2 credits)
  5) BIOL 4898 Fisheries Research I (2 credits)
     and BIOL 4899 Fisheries Research II (2 credits)
Include CHEM 1111 General Chemistry I (4 credits) and CHEM 1112 General Chemistry II (4 credits) as alternatives to CHEM 2211 Principles of Chemistry I (4 credits) and CHEM 2212 Principles of Chemistry II (4 credits), respectively.

Drop PHYS 1102 General Physics II (4 credits) and PHYS 2102 Physics II (5 credits) from Required Courses in Related Fields.

Reason(s) for the change(s):
Refine the curriculum to better prepare students for post-undergraduate careers and/or continuing education.

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 1 Sept 2014 (date) by _email and phone_ (mail, email, or phone).

Please check one of the items below:

__X__ 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.

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.)
SELECT 1 OF THE FOLLOWING COURSES:

- PHYS 1102 General Physics II (4 credits)
- PHYS 2102 Physics II (5 credits)

Aquatic Biology, B.S. major

Required Credits: 77

Aquatic Systems Emphasis: 75
Fisheries Emphasis: 76
Wetlands Ecology Emphasis: 75

Required GPA: 2.25

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)
- BIOL 2620 Field and Laboratory Projects in Ecological Research (2 credits)

II REQUIRED AQUATIC BIOLOGY CORE COURSES

COMPLETE THE FOLLOWING COURSES:

- BIOL 3361 Limnology I (4 credits)
- BIOL 3362 Limnology II 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)
- GEOG 3231 Introduction to Geographic Information Systems (3 credits)
CAPSTONE EXPERIENCE 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 or 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 option A or B.

A. COMPLETE THE FOLLOWING COURSES:

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

B. COMPLETE SOME OTHER CAPSTONE EXPERIENCE APPROVED BY YOUR BIOLOGY ACADEMIC ADVISOR AND THE DEPARTMENT
AQUATIC SYSTEMS EMPHASIS

REQUIRED CORE COURSES
COMPLETE THE FOLLOWING COURSE:

• BIOL 4534 Ichthyology (4 credits)
• BIOL 3850 Marine Biology (3 credits)

ELECTIVE CORE COURSES
SELECT A MINIMUM OF 12 CREDITS FROM THE FOLLOWING:

• BIOL 3310 Entomology (4 credits)
• BIOL 3420 Human Dimensions in Wildlife and Fisheries (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)
• BIOL 4620 Evolution (3 credits)
• GEOG 3232 Intermediate Geographic Information Systems (3 credits)
• CHEM 3150 Standard Methods of Water Analysis (3 credits)
• GEOG 3231 Introduction to Geographic Information Systems (3 credits)

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

CAPSTONE PROJECT

The capstone project may be completed by choosing one of the following 5 options (2 – 4 credits):

• BIOL 4894 Advanced Research Project I (2 credits)
• BIOL 4895 Advanced Research Project II (2 credits)
• BIOL 4898 Fisheries Research I (2 credits)
• BIOL 4894 Advanced Research Project I (2 credits)
  and BIOL 4895 Advanced Research Project II (2 credits)
• BIOL 4898 Fisheries Research I (2 credits)
  and BIOL 4899 Fisheries Research II (2 credits)

**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)

SELECT 1 OF THE FOLLOWING COURSES:

• PHYS 1102 General Physics II (4 credits)
• PHYS 2102 Physics II (5 credits)
Clean Copy

Aquatic Biology, B.S. major (Aquatic Systems Emphasis)

Required Credits: 75

Required GPA: 2.25

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)
- GEOG 3231 Introduction to Geographic Information Systems (3 credits)

III 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 or 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.

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 in Wildlife and Fisheries (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.

CAPSTONE PROJECT
The capstone project may be completed by choosing one of the following 5 options (2 – 4 credits):

• BIOL 4894 Advanced Research Project I (2 credits)
• BIOL 4895 Advanced Research Project II (2 credits)
• BIOL 4898 Fisheries Research I (2 credits)
• BIOL 4894 Advanced Research Project I (2 credits)
  and BIOL 4895 Advanced Research Project II (2 credits)
• BIOL 4898 Fisheries Research I (2 credits)
  and BIOL 4899 Fisheries Research II (2 credits)

REQUIRED COURSES IN RELATED FIELDS
COMPLETE THE FOLLOWING COURSES:
SELECT 1 OF THE FOLLOWING COURSES:

- PHYS 1101 General Physics I (4 credits)
- or PHYS 2101 Physics I (5 credits)
Junior
• BIOL 3361 Limnology I (4 credits)
• BIOL 3362 Limnology II - 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)
• CHEM 3150 Standard Methods of Water Analysis (3 credits)
• or GEOL 3211 Environmental Hydrology (3 credits)

• Complete Liberal Education requirements
• Writing course
• Elective courses in field of emphasis

Senior
• BIOL 4200 Freshwater Invertebrates (4 credits)
• BIOL 4534 Ichthyology (4 credits)
• GEOG 3231 Introduction to Geographic Information Systems (3 credits)
• Capstone Experience Project: Option A, B, or C
• Elective courses in field of emphasis
FISHERIES BIOLOGY EMPHASIS

REQUIRED CORE COURSES
COMPLETE THE FOLLOWING COURSES:

- BIOL 4534 Ichthyology (4 credits)
- BIOL 4545 Fisheries Management (4 credits)

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

- BIOL 3150 Animal Behavior (3 credits)
- BIOL 2339 Ethics of Fish and Wildlife Management (3 credits)
- BIOL 3420 Human Dimensions in Wildlife and Fisheries (3 credits)
- BIOL 3610 Principles of Wildlife Management (3 credits)
- BIOL 3850 Marine Biology (3 credits)
- BIOL 4210 Parasitology (4 credits)
- BIOL 4620 Evolution (3 credits)
- CHEM 3150 Standard Methods of Water Analysis (3 credits)
- ENV 3040 Environmental Economics (3 credits)
- ENV 4210 Environmental Law and Policy (3 credits)
- GEOG 3231 Introduction to Geographic Information Systems (3 credits)

ADDITIONAL ELECTIVES
SELECT AN ADDITIONAL 5-6 CREDITS OF BIOLOGY ELECTIVES AT THE 3000 LEVEL OR ABOVE.

CAPSTONE PROJECT

A. COMPLETE THE FOLLOWING COURSES:

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

REQUAURED 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 2 OF THE FOLLOWING COURSES:

- MATH 2471 Calculus (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)

SELECT 1 OF THE FOLLOWING COURSES:

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

SELECT 1 OF THE FOLLOWING COURSES:

- PHYS 1102 General Physics II (4 credits)
  or PHYS 2102 Physics II (5 credits)
Aquatic Biology, B.S. major (Fisheries Biology Emphasis)

Required Credits: 76
Required GPA: 2.25

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)
- GEOG 3231 Introduction to Geographic Information Systems (3 credits)

III 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 or 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.
FISHERIES BIOLOGY EMPHASIS

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 CORE COURSES
COMPLETE THE FOLLOWING COURSES:

- 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)
- BIOL 3610 Principles of Wildlife Management (3 credits)
- BIOL 3850 Marine Biology (3 credits)
- ENVR 3040 Environmental Economics (3 credits)
or ECON 3040 Environmental Economics (3 credits)
- ENVR 4210 Environmental Law and Policy (3 credits)

CAPSTONE PROJECT

COMPLETE THE FOLLOWING COURSES:

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

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:

- 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)
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 Emphasis

The following is a list of required Aquatic Biology Major, B.S., Fisheries 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)
- BIOL 2620 Field And Laboratory Projects in Ecological Research (2 credits)
- PHYS 1101 General Physics I (4 credits)  
  or PHYS 2101 Physics I (5 credits)
- PHYS 1102 General Physics II (4 credits)
- complete 2 of the following:
  * 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)
- Liberal Education requirements

Junior
- BIOL 3361 Limnology I (4 credits)
- BIOL 3362 Limnology II, 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)
• CHEM 3150 Standard Methods of Water Analysis (3 credits)
  or GEOL 3211 Environmental Hydrology (3 credits)
• Complete Liberal Education requirements
  * Writing course
• Elective courses in field of emphasis

Senior
• BIOL 4898 Fisheries Research I (2 credits)
* BIOL 4899 Fisheries Research II (2 credits)
• BIOL 4545 Fisheries Management
• BIOL 4534 Ichthyology
• GEOG 3231 Introduction to Geographic Information Systems (3 credits)
• Elective courses in field of emphasis
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 8 CREDITS FROM THE FOLLOWING:

- BIOL 3120 Soils (4 credits)
  *or* GEOL 3120 Soils (4 credits)
- BIOL 3420 Human Dimensions in Wildlife and Fisheries (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)
- CHEM 3150 Standard Methods of Water Analysis (3 credits)
- GEOG 3231 Introduction to Geographic Information Systems (3 credits)
- GEOG 3232 Intermediate Geographic Information Systems (3 credits)
- GEOL 3211 Environmental Hydrology (3 credits)
- BIOL 4031 Advanced Wetland Delineation (2 credits)

CAPSTONE PROJECT

The capstone project may be completed in one of the following ways (2 – 4 credits):

- BIOL 4894 Advanced Research Project I (2 credits)
- BIOL 4895 Advanced Research Project II (2 credits)
- BIOL 4898 Fisheries Research I (2 credits)
- BIOL 4894 Advanced Research Project I (2 credits)
  *and* BIOL 4895 Advanced Research Project II (2 credits)
- BIOL 4898 Fisheries Research I (2 credits)
  *and* BIOL 4899 Fisheries Research II (2 credits)
ADDITIONAL ELECTIVES
SELECT AN ADDITIONAL 4-5 CREDITS OF BIOLOGY ELECTIVES AT THE 3000 LEVEL OR ABOVE.

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)

SELECT 1 OF THE FOLLOWING COURSES:

- PHYS 1102 General Physics II (4 credits)
- PHYS 2102 Physics II (5 credits)
Clean Copy

Aquatic Biology, B.S. major (Wetlands Ecology Emphasis)

Required Credits: 75
Required GPA: 2.25

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)
- GEOG 3231 Introduction to Geographic Information Systems (3 credits)

III 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 or 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.
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 in 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)

CAPSTONE PROJECT

The capstone project may be completed in one of the following ways (2-4 credits)

- BIOL 4894 Advanced Research Project I (2 credits)
- BIOL 4895 Advanced Research Project II (2 credits)
- BIOL 4898 Fisheries Research I (2 credits)
- BIOL 4894 Advanced Research Project I (2 credits)
  and BIOL 4895 Advanced Research Project II (2 credits)
- BIOL 4898 Fisheries Research I (2 credits)
  and BIOL 4899 Fisheries Research II (2 credits)

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)
• BIOL 2620 Field And Laboratory Projects in Ecological Research (2 credits)
• PHYS 1101 General Physics I (4 credits)
  or PHYS 2101 Physics I (5 credits)
• PHYS 1102 General Physics II (4 credits)
• STAT 2610 Applied Statistics (4 credits)
  or PSY 3401 Basic Statistics for Research (4 credits)
• Liberal Education requirements

Junior
• BIOL 3361 Limnology I (4 credits)
• BIOL 3362 Limnology II 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)
• CHEM 3150 Standard Methods of Water Analysis (3 credits)
  or GEOL 3211 Environmental Hydrology (3 credits)
• Complete Liberal Education requirements
• Writing course
• Elective courses in field of emphasis
  • BIOL 4030 Wetland Delineation and Classification (3 credits)

Senior
• BIOL/ENVR 3840 Wetlands Ecology (3 credits)
• BIOL 3844 Wetlands Ecology Lab (1 credit)
• BIOL 4031 Advanced Wetland Delineation (2 credits)
• BIOL 4200 Freshwater Invertebrates (4 credits)
• BIOL 4534 Ichthyology
• GEOG 3231 Introduction to Geographic Information Systems (3 credits)
• Capstone Experience Project: Option A, B, or C
• Elective courses in field of emphasis
Course rotation for proposed Aquatic Biology, B.S. major
Compiled by Andy Hafs, Debbie Guelda and Rick Koch

Fall Semester (courses are offered every fall unless noted)
BIOL 1211 Introductory Biology I (Fulton, Hamann)
BIOL 2360 Genetics (Hamann)
BIOL 2610 General Ecology (Hafs, Koch)
BIOL 3310 Entomology (Guelda)
BIOL 3361 Limnology (Hafs)
BIOL 3610 Principles of Wildlife Management (Hiller)
BIOL 3830 Aquatic Plants and Algae (Koch)
BIOL/ENVR 3840 Wetlands Ecology (Koch)
BIOL 3844 Wetlands Ecology Lab (Koch)
BIOL 3850 Marine Biology (Koch) - online
BIOL 4200 Freshwater Invertebrates (Guelda)
BIOL 4545 Fisheries Management (Hafs)
BIOL 4894 Advanced Research Project I (Biology faculty)
BIOL 4898 Fisheries Research I (Hafs)
CHEM 1111 General Chemistry I (Chemistry faculty)
CHEM 2211 Principles of Chemistry I (Chemistry faculty)
CHEM 3150 Standard Methods of Water Analysis (Bilanovic) (currently offered every other year)
ENVR/ECON 3040 Environmental Economics (Kivi)
GEOG 3231 Introduction to Geographic Information Systems (Jones, Stackhouse)
GEOG 3232 Intermediate Geographic Information Systems (Jones)
PHYS 1101 General Physics I (Physics faculty)
PHYS 2101 Physics I (Physics faculty)
PSY 3401 Basic Statistics for Research (Psychology faculty)
MATH 2471 Calculus I (Mathematics faculty)
STAT 2610 Applied Statistics (Statistics faculty)

Spring Semester (courses are offered every spring unless noted)
BIOL 1212 Introductory Biology II (Guelda, Koch, Hafs)
BIOL 2360 Genetics (Hamann)
BIOL 2610 General Ecology (Fulton, Koch)
BIOL 3362 Stream and River Ecology (Guelda)
BIOL 3420 Human Dimensions in Wildlife and Fisheries Management (offered every other year)
  (Hiller)
BIOL 3554 Readings in Aquatic Biology (Hafs, Koch)
BIOL 3723 Ecosystem Ecology (Koch) (offered every other year)
BIOL 3850 Marine Biology (Koch) (offered on campus every other year)
BIOL 4030 Wetland Delineation and Classification (Koch)
BIOL 4031 Advanced Wetland Delineation (Koch) (up to now only offered as needed; under new curriculum, will be offered every other year)
BIOL 4534 Ichthyology (Hafs)
BIOL 4895 Advanced Research Project II (Biology faculty)
BIOL 4899 Fisheries Research II (Hafs)
CHEM 1112 General Chemistry II (Chemistry faculty)
CHEM 2212 Principles of Chemistry II (Chemistry faculty)
GEOG 3231 Introduction to Geographic Information Systems (Jones, Stackhouse)
GEOG 3232 Intermediate Geographic Information Systems (Jones)
GEOL 3211 Environmental Hydrology (Rios-Sanchez)
MATH 2471 Calculus I (Mathematics faculty)
PHIL 2925 Environmental Ethics (Guentchev)
PSY 4403 Advanced Statistics and Research Design (Gora)
PSY 3401 Basic Statistics for Research (Psychology faculty)
STAT 2610 Applied Statistics (Statistics faculty)

Summer Session (courses are offered every summer unless noted)
BIOL 2339 Ethics of Fish and Wildlife Management (Hafs)
BIOL 2360 Genetics (Hamann) - online
BIOL 2610 General Ecology (Koch) - online
BIOL 3420 Human Dimensions in Wildlife and Fisheries Management (Hiller) - online
BIOL/GEOG 3630 Conservation Biology (will be offered in the fall when E. Rave is no longer chair) (Rave) - online
BIOL 3850 Marine Biology (Koch) - online
BIOL 4620 Organic Evolution (will be offered on campus in the spring when E. Rave is no longer chair for the Biology Department) (Rave) - online

Unknown for now
ENVR 4210 Environmental Law and Policy (Kivi plans to offer this each year, but which semester it will be offered has yet to be determined)
BIOL/GEOL 3120 Soils (was taught by Greenberg, in future may be taught by Sea or Koch) (will likely be offered every other year)
BSU Curriculum Forms

Form 8

Signatures

Richard W. Koch / Professor of Biology / 09.07.2015
Proposer / Title / Date

Debbie Guelda / Professor of Biology / 09.08.2015
Proposer / Title / Date

Andrew Hafs / Professor of Biology / 09.08.2015
Proposer / Title / Date

Elizabeth Rave / Professor of Biology-Department Chair / 09.09.2015
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).

Colleen Greer / Dean of College of Arts and Sciences / 11.13.15
Dean / College / Date

[Note: at this point, packet goes to Academic Affairs Office.]