## Curriculum Proposal

**BIOL 19-20 #1**

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BSU Curriculum Forms

Form 1

Curriculum Modification Summary

College: College of Business, Mathematics and Sciences
Department: Biology
Proposer: Kjerstin Owens
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.):

This is a program modification proposal for the B.S. in Biology major. Currently, the B.S. degree in Biology is restrictive to students wishing to pursue a general biology. With the addition of a new B.S. in Wildlife biology major three years ago and a new B.S. in Biochemistry, Cellular and Molecular Biology major in the fall of 2018, we are proposing to make the B.S. in Biology major less prescribed. The following changes are proposed:

- The overall credits needed to earn a B.S. in Biology is currently 68 credits. This proposal reduces the credits to 60. This will help the students finish their degree in a timelier fashion.
- Under the current biology degree, students must take at least one course from of required biology electives from each of two categories, suborganismal and organismal. The proposal allows students to select any elective from biology courses (except 1000-level and BIOL2925). This gives students more freedom in their elective choices.
- Students can currently use successful completion of a professional or graduate school exam as their capstone project (BIOL 4800) as long as they score in the 60th percentile of the nationwide scores for that exam. This option was rarely used by students for their capstone project. When it was attempted, often times students did not place within the 60th percentile. Students earning a B.S. in Biology are better served by a culminating experience such as original research, internships and shadowing. Therefore, we a proposing to drop BIOL 4800 as an option to fulfill the capstone.
- Currently, the B.S. in biology has a very regimented and restrictive list of required courses in related fields. We are proposing to allow students to choose between Physics courses and upper level Chemistry courses and have added an additional option to the math courses. This will allow students to tailor their curriculum for their postgraduate plans.
Modifications proposed (specify number of each):

_____Course Modification(s) (form 2)
_____New Course(s) (form 3)
_____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

x Undergraduate Curriculum
_____Graduate Curriculum
_____Teacher Licensure Program(s)
BSU Curriculum Forms

Form 5

Program Modification Form

Program to be modified: Biology B.S. major
List all proposed change(s):
- Remove organismal/suborganismal divisions in the Biology BS.
- Change Capstone requirements
- Change course requirements for Required Courses in Related Fields
- Change number of elective credits

Reason(s) for the change(s):
Biology BS degree will be changed to simplify and streamline course requirements for the major. The changes will provide greater course flexibility to students seeking the major without compromising post-graduate professional opportunities.

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 5/16/2019 (date) by email (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.

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.)

Old Curriculum with Track Changes

Biology, B.S. major

Required Credits: 68 68 60
Required GPA: 2.25

I REQUIRED BIOLOGY CORE COURSES

COMPLETE THE FOLLOWING COURSES:

• BIOL 1211 Introductory Biology I (4 credits) (Note: this course in process of title change)
• BIOL 1212 Introductory Biology II (4 credits) (Note: this course in process of title change)
• BIOL 2360 Genetics (4 credits)
• BIOL 2610 General Ecology (3 credits)

II REQUIRED BIOLOGY ELECTIVES

SUBORGANISMAL
SELECT 1 OF THE FOLLOWING COURSES:

• BIOL 2750 Medical Microbiology (3 credits)
• BIOL 3260 Human Physiology (4 credits)
• BIOL 3390 Introduction to Hematology (4 credits)
• BIOL 3380 Molecular Genetics (3 credits)
• BIOL 3580 Immunology (3 credits)
• BIOL 3590 Cell Biology (3 credits)
• BIOL 3720 Plant Form and Function (4 credits)
• BIOL 4270 Histology (4 credits)
• BIOL 4360 Developmental and Tumor Biology (3 credits)

ORGANISMAL
SELECT 1 OF THE FOLLOWING COURSES:

• BIOL 2110 Human Anatomy and Physiology (5 credits)
• BIOL 3250 Human Anatomy (4 credits)
• BIOL 3310 Entomology (4 credits)
• BIOL 3710 Microbiology (4 credits)
• BIOL 3730 Plant Diversity (4 credits)
• BIOL 3830 Aquatic Plants and Algae (4 credits)
• BIOL 4210 Parasitology (4 credits)
• BIOL 4510 Ornithology (3 credits)
II REQUIRED BIOLOGY ELECTIVES

BIOLOGY ELECTIVE COURSES

SELECT ELECTIVES FROM BIOLOGY COURSES (EXCEPT 1000-LEVEL BIOL CLASSES AND BIOL 2925) TO ACHIEVE A MINIMUM OF 40 SEMESTER CREDITS IN BIOL COURSES. THESE ELECTIVES CAN ALSO INCLUDE ONE OF THE FOLLOWING OPTIONS FROM OTHER DEPARTMENTS

Select BIOL course electives (2000 level and above) to achieve a minimum of 40 credits. (BIOL 2925 is excluded as an option.) Electives can include one of the following options from other departments.

- a. CHEM 4411
- b. CHEM 4411 and 4471
- c. ENVR 4400
- d. ENVR 4500

- Select electives from the following options:
  - ENVR 4400 Environmental Microbiology (3 credits)
  - ENVR 4500 Environmental Toxicology (4 credits)

SUBORGANISMAL

III CAPSTONE PROJECT

The 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, internships with state or federal agencies, or shadowing experiences with professionals.

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 (except for professional/graduate school entrance exams).

1. Students using a professional or graduate entrance exam as their capstone project must register for this course. Students must place in at least the 60th percentile on their exam to successfully complete this course.

2. Complete BIOL 4894 OR BIOL 4895 (2 credits):

- BIOL 4894 Advanced Research Project I (2 credits)
- BIOL 4895 Advanced Research Project II (2 credits)
23. Complete BIOL 4894 AND BIOL 4895 (2 credits each):
   - BIOL 4894 Advanced Research Project I (2 credits)
   - BIOL 4895 Advanced Research Project II (2 credits)

34. Complete BIOL 4449 (4 credits):
   - BIOL 4449 Gene Expression (4 credits)

IV REQUIRED GENERAL BIOLOGY ELECTIVES
SELECT ELECTIVES FROM BIOLOGY COURSES (EXCEPT 1000-LEVEL BIOL CLASSES AND BIOL 2925) TO ACHIEVE A MINIMUM OF 40 SEMESTER CREDITS IN BIOL COURSES. THESE

A. SELECT 1 OF THE FOLLOWING GROUPS (8 credits):

GROUP 1:
   - CHEM 2211 Principles of Chemistry I (4 credits)
   - CHEM 2212 Principles of Chemistry II (4 credits)

GROUP 2:
   - CHEM 1111 General Chemistry I (4 credits)
   - CHEM 1112 General Chemistry II (4 credits)

D. COMPLETE THE FOLLOWING 4 COURSES:
   - CHEM 3311 Organic Chemistry I (3 credits)
   - CHEM 3312 Organic Chemistry II (3 credits)
   - CHEM 3371 Organic Chemistry Laboratory I (1 credit)
   - CHEM 3372 Organic Chemistry Laboratory II (1 credit)

B. Complete a minimum of 8 credits from the following courses:
   - CHEM 3311 Organic Chemistry I (3 credits)
     and CHEM 3371 Organic Chemistry Laboratory I (1 credit)
   - CHEM 3312 Organic Chemistry II (3 credits)
     and CHEM 3372 Organic Chemistry Laboratory II (1 credit)
   - CHEM 4411 Biochemistry I (3 credits)
   - CHEM 4471 Biochemistry I Laboratory (1 credit)
   - PHYS 1101 General Physics I (4 credits)
     or PHYS 2101 Physics I (5 credits) (Note this course in process of changing to 4 credits)
B. SELECT 1 OF THE FOLLOWING COURSES

- PHYS 1102 General Physics II (4 credits)
  - or PHYS 2102 Physics II (5 credits) (Note this course in process of changing to 4 credits)

C. SELECT 1 OF THE FOLLOWING COURSES

- MATH 2471 Calculus (5 credits)
- STAT 2610 Applied Statistics (4 credits)
- PSY 3401 Basic Statistics for Research (4 credits)

C. SELECT 1 OF THE FOLLOWING GROUPS:

SUGGESTED SEMESTER SCHEDULE FOR BIOLOGY MAJOR, B.S.

The following is a list of required Biology Major, B.S. courses arranged by year. This schedule is intended to assist students in planning their courses in an orderly fashion. 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 Biology academic advisor as to the proper courses and sequence of courses needed for graduation.

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
- Math prerequisite, if needed
- Consult with your Biology academic advisor

Sophomore
- BIOL 2360 Genetics (4 credits)
- BIOL 2610 General Ecology (3 credits)
- 8 credits of the following:
  - CHEM 3311 Organic Chemistry I (3 credits)
  - CHEM 3312 Organic Chemistry II (3 credits)
  - CHEM 3371 Organic Chemistry Laboratory I (1 credit)
  - CHEM 3372 Organic Chemistry Laboratory II (1 credit)
  - PHYS 1101 General Physics I (4 credits)
    - or PHYS 2101 Physics I (5 credits)
  - PHYS 1102 General Physics II (4 credits)
    - or PHYS 2102 Physics II (5 credits)
- MATH 2471 Calculus (5 credits), STAT 2610 Applied Statistics (4 credits), or PSY 3402 Basic Stats for Research (4 credits)

Biology degree requirements
- Consult with your Biology academic advisor
Junior
- Biology degree requirements
  - CHEM 4411 Biochemistry I (3 credits) and CHEM 4471 Biochemistry I Laboratory (1 credit), if needed
  - Liberal Education requirements
  - Consult with your Biology academic advisor

Senior
- Capstone project
- Complete Biology degree requirements
- Complete Liberal Education requirements
- Consult with your Biology academic advisor
New Curriculum

Biology, B.S. major

Required Credits: 60
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 BIOLOGY ELECTIVE COURSES

Select BIOL course electives (2000 level and above) to achieve a minimum of 40 credits. (BIOL 2925 is excluded as an option.) Electives can include one of the following options from other departments.

• ENVR 4400 Environmental Microbiology (3 credits)
• ENVR 4500 Environmental Toxicology (4 credits)

III CAPSTONE PROJECT

The 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, internships with state or federal agencies, or shadowing experiences with professionals.

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

1. Complete BIOL 4894 OR BIOL 4895 (2 credits):
• BIOL 4894 Advanced Research Project I (2 credits)
• BIOL 4895 Advanced Research Project II (2 credits)

2. Complete BIOL 4894 AND BIOL 4895 (2 credits each):
• BIOL 4894 Advanced Research Project I (2 credits)
• BIOL 4895 Advanced Research Project II (2 credits)

3. Complete BIOL 4449 (4 credits):
• BIOL 4449 Gene Expression (4 credits)

IV REQUIRED COURSES IN RELATED FIELDS (Minimum of 20 credits)

A. SELECT 1 OF THE FOLLOWING GROUPS (8 credits):

GROUP 1:
• CHEM 2211 Principles of Chemistry I (4 credits)
• CHEM 2212 Principles of Chemistry II (4 credits)

GROUP 2:
• CHEM 1111 General Chemistry I (4 credits)
• CHEM 1112 General Chemistry II (4 credits)

B. Complete 8 credits from the following courses:

- CHEM 3311 Organic Chemistry I (3 credits)
  and CHEM 3371 Organic Chemistry Laboratory I (1 credit)
- CHEM 3312 Organic Chemistry II (3 credits)
  and CHEM 3372 Organic Chemistry Laboratory II (1 credit)
- CHEM 4411 Biochemistry I (3 credits)
- CHEM 4471 Biochemistry I Laboratory (1 credit)
- PHYS 1101 General Physics I (4 credits)
  or PHYS 2101 Physics I (5 credits)
- PHYS 1102 General Physics II (4 credits)
  or PHYS 2102 Physics II (5 credits)

C. Select 1 of the following courses:

- MATH 2471 Calculus (5 credits)
• STAT 2610 Applied Statistics (4 credits)
• PSY 3401 Basic Statistics for Research (4 credits)

SUGGESTED SEMESTER SCHEDULE FOR BIOLOGY MAJOR, B.S.

The following is a list of required Biology Major, B.S. courses arranged by year. This schedule is intended to assist students in planning their courses in an orderly fashion. 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 Biology academic advisor as to the proper courses and sequence of courses needed for graduation.

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
• Math prerequisite, if needed
• Consult with your Biology academic advisor

Sophomore
• BIOL 2360 Genetics (4 credits)
• BIOL 2610 General Ecology (3 credits)
• 8 credits of the following:
  • CHEM 3311 Organic Chemistry I (3 credits)
  • CHEM 3312 Organic Chemistry II (3 credits)
  • CHEM 3371 Organic Chemistry Laboratory I (1 credit)
  • CHEM 3372 Organic Chemistry Laboratory II (1 credit)
  • PHYS 1101 General Physics I (4 credits)
    or PHYS 2101 Physics I (5 credits)
  • PHYS 1102 General Physics II (4 credits)
    or PHYS 2102 Physics II (5 credits)
  • MATH 2471 Calculus (5 credits), STAT 2610 Applied Statistics (4 credits), or PSY 3402
    Basic Stats for Research (4 credits)
• Liberal Education requirements
• Consult with your Biology academic advisor

Junior
• Biology degree requirements
• CHEM 4411 Biochemistry I (3 credits) and CHEM 4471 Biochemistry I Laboratory (1 credit), if needed
• Liberal Education requirements
• Consult with your Biology academic advisor

Senior
• Capstone project
• Complete Biology degree requirements
• Complete Liberal Education requirements
• Consult with your Biology academic advisor
BSU Curriculum Forms

Form 8
Updated: 09.18.15

Signatures

  Kjerstin Owens / Associate Professor of Biology / 5.13.19
  Proposer / Title / Date

  Michael Hamman (for MW) / Biology / 5.15.19
  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.

  Bonnie Higgins / Business, Mathematics and Sciences / 6.3.19
  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.