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| --- |
| For Academic Affairs and Research Use Only |
| Proposal Number | SM01 |
| CIP Code:  |  |
| Degree Code: |  |

**New or Modified Course Proposal Form**

**[ X ] Undergraduate Curriculum Council**

**[ ] Graduate Council**

|  |
| --- |
| **[ ]New Course, [ ]Experimental Course (1-time offering), or [ X ]Modified Course (Check one box)** |

Signed paper copies of proposals submitted for consideration are no longer required. Please type approver name and enter date of approval.

|  |  |
| --- | --- |
| Virginie Rolland 11/9/21**Department Curriculum Committee Chair** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date…**COPE Chair (if applicable)** |
| Stephen J. Mullin 11/9/2021**Department Chair** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date…**Head of Unit (if applicable)**   |
| John Hershberger 11/10/2021 Enter date…**College Curriculum Committee Chair** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date…**Undergraduate Curriculum Council Chair** |
| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date…**Director of Assessment (new courses only)** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date…**Graduate Curriculum Committee Chair** |
| Lynn Boyd 11/12/2021**College Dean** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date…**Vice Chancellor for Academic Affairs** |
| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date…**General Education Committee Chair (if applicable)**   |  |

1. **Contact Person (Name, Email Address, Phone Number)**

SJ Mullin; smullin@astate.edu; x3082

1. **Proposed starting term and Bulletin year for new course or modification to take effect**

Autumn 2022 (print in AY22-23 Bulletin)

**Instructions:**

*Please complete all sections unless otherwise noted. For course modifications, sections with a “Modification requested?” prompt need not be completed if the answer is “No.”*

|  |  |  |
| --- | --- | --- |
|  | **Current (Course Modifications Only)** | **Proposed (New or Modified)** *(Indicate “N/A” if no modification)* |
| **Prefix** | **BIO** | **BIO** |
| **Number\*** | **3302****3312** | **4324** |
| **Title** | **Comparative Anatomy****Comparative Anatomy Laboratory** | **Comparative Vertebrate Anatomy** |
| **Description\*\*** | BIO 3302. Comparative Anatomy: Chordate morphology, phylogeny, ontogeny, organology, and homology. Lecture two hours per week. Special course fees may apply. Prerequisites, BIO 1301 and BIO 1303. Fall, odd.BIO 3312. Comparative Anatomy Laboratory: Four hours per week. Special course fees may apply. To be taken concurrently with BIO 3302. Fall, odd. | BIO 4324. Comparative Vertebrate Anatomy: The functional morphology of chordates, with emphasis on those with backbones. Anatomical structures are presented with a focus on phylogeny, ontogeny, and structural homology. Lecture two hours and lab four hours per week. Special course fees apply. Prerequisites, BIO 1301, 1303, 2011 and 2013.  |

 ***\**** (Confirm with the Registrar’s Office that number chosen has not been used before and is available for use. For variable credit courses, indicate variable range. *Proposed number for experimental course is 9*. )

\*\*Forty words or fewer as it should appear in the Bulletin.

1. **Proposed prerequisites and major restrictions** **[Modification requested? Yes/No]**

(Indicate all prerequisites. If this course is restricted to a specific major, which major. If a student does not have the prerequisites or does not have the appropriate major, the student will not be allowed to register).

1. YES Are there any prerequisites?
	1. If yes, which ones?

Successful completion of BIO 1301, 1303, 2011, and 2013.

* 1. Why or why not?

Student understanding of material presented in prerequisite courses will avoid unnecessary redundancy and review of foundational material. Specifically, students need background in taxonomy and basic phylogenetic relationships, which are highlighted in Biology of Animals (BIO 1301/1303), as well as the basic architecture and functioning of animal cells that are highlighted in Biology of the Cell (BIO 2011/2013).

1. NO Is this course restricted to a specific major? (available to BIO minors who have satisfied prerequisite requirements).
	1. If yes, which major? Enter text...
2. **Proposed course frequency [Modification requested? YES]**

(e.g. Fall, Spring, Summer; if irregularly offered, please indicate, “irregular.”) *Not applicable to Graduate courses.*

Fall

1. **Proposed course type [Modification requested? YES]**

Will this course be lecture only, lab only, lecture and lab, activity (e.g., physical education), dissertation/thesis, capstone, independent study, internship/practicum, seminar, special topics, or studio? Please choose one.

Lecture and lab

1. **Proposed grade type [Modification requested? NO]**

What is the grade type (i.e. standard letter, credit/no credit, pass/fail, no grade, developmental, or other [please elaborate])

Standard letter

1. NO Is this course dual-listed (undergraduate/graduate)?
2. NO Is this course cross-listed?

*(If it is, all course entries must be identical including course descriptions. Submit appropriate documentation for requested changes. It is important to check the course description of an existing course when adding a new cross-listed course.)*

**a.** – If yes, please list the prefix and course number of the cross-listed course.

 Enter text...

 **b.** – **Yes / No** Can the cross-listed course be used to satisfy the prerequisite or degree requirements this course satisfies?

 Enter text...

1. NO Is this course in support of a new program?

a. If yes, what program?

 Enter text...

1. NO Will this course be a one-to-one equivalent to a deleted course or previous version of this course (please check with the Registrar if unsure)?

a. If yes, which course?

**Course Details**

1. **Proposed outline** **[Modification requested? YES]**

(The course outline should be topical by weeks and should be sufficient in detail to allow for judgment of the content of the course.)

**Comparative Vertebrate Anatomy**

 Lecture Schedule

Week Topic

1 Introduction: Anatomical & functional orientation

 Chordates: Their common traits and evolution

2 Vertebrates: Evolution & survey of the clades

 Tissues & Skeletal systems I – bone formation & structure

3 Integument & its derivatives

 Skeletal systems III – cranial & visceral elements

4 **1ST lecture examination**

 Skeletal systems II – axial elements

5 Skeletal systems IV – appendicular elements

6 Muscular systems

7 Digestive systems

8 **2nd lecture examination**

 Respiratory systems

9 Circulatory systems I – blood elements & the lymphatic system

10 Circulatory systems II – evolution of the heart & blood flow

11 Excretory systems

12 Reproductive systems

13 **3rd lecture examination**

 Nervous systems I – development and cranial elements

14 Nervous systems II – sensory organs

15 Endocrine systems

 Immune Systems

Final Exam

 Laboratory Schedule

Week of Subject matter

1 Introduction – anatomical and functional orientation

 – non-gnathostome anatomy

2 *Squalus*, *Amia*, and *Perca* skeletons

3 *Necturus*, chelonian, and *Gallus* skeletons

4 *Felis* and *Homo* skeletons

5 comparative review + **1st practical exam**

6 *Squalus* muscles

7 *Necturus, Lithobates*, and *Columba* muscles

8 *Felis* muscles I – abdominal & thoracic regions

9 *Felis* muscles II – cranial & appendicular regions

10 comparative review + **2nd practical exam**

11 *Squalus* visceral & circulatory systems

12 *Necturus, Lithobates* and squamate visceral & circulatory systems

13 *Felis* visceral & circulatory systems

14 Comparative neuro-anatomy lab (*Squalus* and *Ovis*)

15 **3rd practical exam**

1. **Proposed special features** **[Modification requested? NO]**

(e.g. labs, exhibits, site visitations, etc.)

Enter text...

1. **Department staffing and classroom/lab resources**

Course taught by Mullin or Thigpen, depending on course rotations, and curricular demand.

1. Will this require additional faculty, supplies, etc.?

NO

1. YES Does this course require course fees?

 *If yes: please attach the New Program Tuition and Fees form, which is available from the UCC website.*

**Justification**

**Modification Justification (Course Modifications Only)**

1. Justification for Modification(s)

The existing structure for this course (with separate lecture and lab sections) fails to prepare the students for what is expected at the next level because the content is each is directly related to the other. This proposal combines the lecture and lab into a 4-credit course with a single grade. Lecture and lab content are complementary, with the student learning material in one portion of the course that reinforces terminology and concepts that are presented in the other portion of the course. Laboratories require student participation for the entire period, including time need for proper preservation and storage of dissected specimens. Combining the lecture and lab components into a single course means that students successfully completing the modified course will be better prepared for post-graduate opportunities such as professional or graduate school.

Change in course level designation (3000- to 4000-level) is justified based on the prerequisite structure for successful completion of this course (i.e., we don’t want to be setting students up for failure).

Change in frequency from “fall, odd” to “fall” is to accommodate the expected increase in demand as a result of changes to both advising and programming strategies. Lab sections must be limited in their size, so the only way to accommodate the increased demand is to increase the frequency with which the course is offered.

FEE justification: (A) The course fee has not been changed in over 5 years, and inflationary increases in commodities and preserved specimens have resulted in higher costs to deliver the course. (B) The preserved specimens that are purchased for student dissections are one-time use materials, and fresh sets need to be purchased each time the course is offered.

The courses BIO 3302 and BIO 3312 that are the current pre-requisites will be the new combined course BIO 4424 (see Therefore, the pre-requisite course number for BIO 4332 will need to be updated and is reflected in the bulletin change section.

**New Course Justification (New Courses Only)**

1. Justification for course. Must include:

 a. Academic rationale and goals for the course (skills or level of knowledge students can be expected to attain)

 Enter text...

b. How does the course fit with the mission of the department? If course is mandated by an accrediting or certifying agency, include the directive.

 Enter text...

c. Student population served.

Enter text...

d. Rationale for the level of the course (lower, upper, or graduate).

Enter text...

**Assessment**

**Assessment Plan Modifications (Course Modifications Only)**

1. NO Do the proposed modifications result in a change to the assessment plan?

 *If yes, please complete the Assessment section of the proposal*

**Relationship with Current Program-Level Assessment Process (Course modifications skip this section unless the answer to #18 is “Yes”)**

1. What is/are the intended program-level learning outcome/s for students enrolled in this course? Where will this course fit into an already existing program assessment process?

Enter text...

1. Considering the indicated program-level learning outcome/s (from question #19), please fill out the following table to show how and where this course fits into the program’s continuous improvement assessment process.

*For further assistance, please see the ‘Expanded Instructions’ document available on the UCC - Forms website for guidance, or contact the Office of Assessment at 870-972-2989.*

|  |  |
| --- | --- |
| **Program-Level Outcome 1 (from question #19)** | Type outcome here. What do you want students to think, know, or do when they have completed the course? |
| Assessment Measure | Please include direct and indirect assessment measure for outcome.  |
| Assessment Timetable | What semesters, and how often, is the outcome assessed? |
| Who is responsible for assessing and reporting on the results? | Who (person, position title, or internal committee) is responsible for assessing, evaluating, and analyzing results, and developing action plans? |

 *(Repeat if this new course will support additional program-level outcomes)*

 **Course-Level Outcomes**

1. What are the course-level outcomes for students enrolled in this course and the associated assessment measures?

|  |  |
| --- | --- |
| **Outcome 1** | Type outcome here. What do you want students to think, know, or do when they have completed the course? |
| Which learning activities are responsible for this outcome? | List learning activities. |
| Assessment Measure  | What will be your assessment measure for this outcome?  |

*(Repeat if needed for additional outcomes)*

**Bulletin Changes**

|  |
| --- |
| **Instructions**  |
| **Please visit** [**http://www.astate.edu/a/registrar/students/bulletins/index.dot**](http://www.astate.edu/a/registrar/students/bulletins/index.dot) **and select the most recent version of the bulletin. Copy and paste all bulletin pages this proposal affects below. Please include a before (with changed areas highlighted) and after of all affected sections.** **\*Please note: Courses are often listed in multiple sections of the bulletin. To ensure that all affected sections have been located, please search the bulletin (ctrl+F) for the appropriate courses before submission of this form.**  |

CURRENT VERSION (pg. 412):

The bulletin can be accessed at https://www.astate.edu/a/registrar/students/bulletins/

Emphasis Area (Biology): Sem. Hrs.

BIO 3033, Evolution 3

BIO 3302 AND 3312, Comparative Anatomy and Laboratory 4

BIO 3303 AND 3301, General Entomology and Laboratory OR

BIO 3322 AND 3332, Invertebrate Zoology and Laboratory

4

BIO 4443 AND 4441, Comparative Animal Physiology and Laboratory OR

BIO 4513, Plant Physiology

3-4

BIO 4104, Microbiology 4

BIO 4133 AND BIO 4131, Cell Biology and Laboratory OR

CHEM 4243, Biochemistry

3-4

BIO 4332 AND 4342, Animal Histology and Laboratory OR

BIO 4343 AND 4341, Animal Embryology and Laboratory

4

BIO 4542 AND 4541, Mycology and Laboratory OR

BIO 4552 AND 4551, Medical Mycology and Laboratory

3

BIO 4704, Plant Systematics OR

BIO 4522 AND 4521, Wetland Plant Ecology and Laboratory

3-4

STAT 3233, Applied Statistics I 3

Electives (BIO prefix) 5-8

Sub-total 42

Total Required Hours: 120

REVISED VERSION:

The bulletin can be accessed at https://www.astate.edu/a/registrar/students/bulletins/

Emphasis Area (Biology): Sem. Hrs.

BIO 3033, Evolution 3

BIO 4324, Comparative Vertebrate Anatomy 4

BIO 3303 AND 3301, General Entomology and Laboratory OR

BIO 3322 AND 3332, Invertebrate Zoology and Laboratory

4

BIO 4443 AND 4441, Comparative Animal Physiology and Laboratory OR

BIO 4513, Plant Physiology

3-4

BIO 4104, Microbiology 4

BIO 4133 AND BIO 4131, Cell Biology and Laboratory OR

CHEM 4243, Biochemistry

3-4

BIO 4332 AND 4342, Animal Histology and Laboratory OR

BIO 4343 AND 4341, Animal Embryology and Laboratory

4

BIO 4542 AND 4541, Mycology and Laboratory OR

BIO 4552 AND 4551, Medical Mycology and Laboratory

3

BIO 4704, Plant Systematics OR

BIO 4522 AND 4521, Wetland Plant Ecology and Laboratory

3-4

STAT 3233, Applied Statistics I 3

Electives (BIO prefix) 5-8

Sub-total 42

Total Required Hours: 120

CURRENT VERSION (pg. 414):

Major in Biological Sciences

Bachelor of Science

Emphasis in Pre-professional Studies

A complete 8-semester degree plan is available at https://www.astate.edu/info/academics/degrees/

University Requirements:

See University General Requirements for Baccalaureate degrees (p. 47)

First Year Making Connections Course: Sem. Hrs.

BIO 1013, Making Connections - Biology 3

General Education Requirements: Sem. Hrs.

See General Education Curriculum for Baccalaureate degrees (p. 84)

Students with this major must take the following:

MATH 1023, College Algebra or MATH course that requires MATH 1023 as a prerequisite

CHEM 1013 AND 1011, General Chemistry I and Laboratory

BIO 2013 AND 2011, Biology of the Cell and Laboratory

COMS 1203, Oral Communication (Required Departmental Gen. Ed. Option)

35

Language Requirement: Sem. Hrs.

A student must complete the foreign language requirements before being considered a

Biological Sciences Major. (Refer to Department of Biological Sciences Foreign Language

Requirement).

Major Requirements: Sem. Hrs.

BIO 1303 AND 1301, Biology of Animals and Laboratory 4

BIO 1503 AND 1501, Biology of Plants and Laboratory 4

BIO 3013 AND 3011, Genetics and Laboratory 4

BIO 3023, Principles of Ecology 3

BIO 4021, Biological Seminar 1

CHEM 1023 AND 1021, General Chemistry II and Laboratory 4

CHEM 3103 AND 3101, Organic Chemistry I and Laboratory 4

CHEM 3113 AND 3111, Organic Chemistry II and Laboratory 4

MATH 2194, Survey of Calculus OR

MATH 2204, Calculus I

4

PHYS 2054, General Physics I 4

PHYS 2064, General Physics II 4

Sub-total 40

Emphasis Area (Pre-professional Studies): Sem. Hrs.

BIO 3302 AND 3312, Comparative Anatomy and Laboratory AND

BIO 4443 AND 4441, Comparative Animal Physiology and Laboratory OR

BIO 3223 AND 3221, Human Structure and Function I and Laboratory AND

BIO 3233 AND 3231, Human Structure and Function II and Laboratory

8

BIO 4104, Microbiology 4

BIO 4133 AND 4131, Cell Biology and Laboratory OR

CHEM 4243, Biochemistry

3-4

REVISED VERSION:

Major in Biological Sciences

Bachelor of Science

Emphasis in Pre-professional Studies

A complete 8-semester degree plan is available at https://www.astate.edu/info/academics/degrees/

University Requirements:

See University General Requirements for Baccalaureate degrees (p. 47)

First Year Making Connections Course: Sem. Hrs.

BIO 1013, Making Connections - Biology 3

General Education Requirements: Sem. Hrs.

See General Education Curriculum for Baccalaureate degrees (p. 84)

Students with this major must take the following:

MATH 1023, College Algebra or MATH course that requires MATH 1023 as a prerequisite

CHEM 1013 AND 1011, General Chemistry I and Laboratory

BIO 2013 AND 2011, Biology of the Cell and Laboratory

COMS 1203, Oral Communication (Required Departmental Gen. Ed. Option)

35

Language Requirement: Sem. Hrs.

A student must complete the foreign language requirements before being considered a

Biological Sciences Major. (Refer to Department of Biological Sciences Foreign Language

Requirement).

Major Requirements: Sem. Hrs.

BIO 1303 AND 1301, Biology of Animals and Laboratory 4

BIO 1503 AND 1501, Biology of Plants and Laboratory 4

BIO 3013 AND 3011, Genetics and Laboratory 4

BIO 3023, Principles of Ecology 3

BIO 4021, Biological Seminar 1

CHEM 1023 AND 1021, General Chemistry II and Laboratory 4

CHEM 3103 AND 3101, Organic Chemistry I and Laboratory 4

CHEM 3113 AND 3111, Organic Chemistry II and Laboratory 4

MATH 2194, Survey of Calculus OR

MATH 2204, Calculus I

4

PHYS 2054, General Physics I 4

PHYS 2064, General Physics II 4

Sub-total 40

Emphasis Area (Pre-professional Studies): Sem. Hrs.

BIO 4324, Comparative Vertebrate Anatomy AND

BIO 4443 AND 4441, Comparative Animal Physiology and Laboratory OR

BIO 3223 AND 3221, Human Structure and Function I and Laboratory AND

BIO 3233 AND 3231, Human Structure and Function II and Laboratory

8

BIO 4104, Microbiology 4

BIO 4133 AND 4131, Cell Biology and Laboratory OR

CHEM 4243, Biochemistry

3-4

CURRENT VERSION (pg. 416):

Major in Biological Sciences

Bachelor of Science

Emphasis in Zoology

A complete 8-semester degree plan is available at https://www.astate.edu/info/academics/degrees/

University Requirements:

See University General Requirements for Baccalaureate degrees (p. 47)

First Year Making Connections Course: Sem. Hrs.

BIO 1013, Making Connections - Biology 3

General Education Requirements: Sem. Hrs.

See General Education Curriculum for Baccalaureate degrees (p. 84)

Students with this major must take the following:

MATH 1023, College Algebra or MATH course that requires MATH 1023 as a prerequisite

CHEM 1013 AND 1011, General Chemistry I and Laboratory

BIO 2013 AND 2011, Biology of the Cell and Laboratory

COMS 1203, Oral Communication (Required Departmental Gen. Ed. Option)

35

Language Requirement: Sem. Hrs.

A student must complete the foreign language requirements before being considered a

Biological Sciences Major. (Refer to Department of Biological Sciences Foreign Language

Requirement).

Major Requirements: Sem. Hrs.

BIO 1303 AND 1301, Biology of Animals and Laboratory 4

BIO 1503 AND 1501, Biology of Plants and Laboratory 4

BIO 3013 AND 3011, Genetics and Laboratory 4

BIO 3023, Principles of Ecology 3

BIO 4021, Biological Seminar 1

CHEM 1023 AND 1021, General Chemistry II and Laboratory 4

CHEM 3103 AND 3101, Organic Chemistry I and Laboratory 4

CHEM 3113 AND 3111, Organic Chemistry II and Laboratory 4

MATH 2194, Survey of Calculus OR

MATH 2204, Calculus I

4

PHYS 2054, General Physics I 4

PHYS 2064, General Physics II 4

Sub-total 40

Emphasis Area (Zoology): Sem. Hrs.

BIO 3302 AND 3312, Comparative Anatomy and Laboratory 4

BIO 3303 AND 3301, General Entomology and Laboratory OR

BIO 3322 AND 3332, Invertebrate Zoology and Laboratory

4

BIO 4443 AND 4441, Comparative Animal Physiology and Laboratory 4

BIO 4332 AND 4342, Animal Histology and Laboratory 4

BIO 4343 AND 4341, Animal Embryology and Laboratory 4

STAT 3233, Applied Statistics I OR

CHEM 4243, Biochemistry

3

REVISED VERSION:

Major in Biological Sciences

Bachelor of Science

Emphasis in Zoology

A complete 8-semester degree plan is available at https://www.astate.edu/info/academics/degrees/

University Requirements:

See University General Requirements for Baccalaureate degrees (p. 47)

First Year Making Connections Course: Sem. Hrs.

BIO 1013, Making Connections - Biology 3

General Education Requirements: Sem. Hrs.

See General Education Curriculum for Baccalaureate degrees (p. 84)

Students with this major must take the following:

MATH 1023, College Algebra or MATH course that requires MATH 1023 as a prerequisite

CHEM 1013 AND 1011, General Chemistry I and Laboratory

BIO 2013 AND 2011, Biology of the Cell and Laboratory

COMS 1203, Oral Communication (Required Departmental Gen. Ed. Option)

35

Language Requirement: Sem. Hrs.

A student must complete the foreign language requirements before being considered a

Biological Sciences Major. (Refer to Department of Biological Sciences Foreign Language

Requirement).

Major Requirements: Sem. Hrs.

BIO 1303 AND 1301, Biology of Animals and Laboratory 4

BIO 1503 AND 1501, Biology of Plants and Laboratory 4

BIO 3013 AND 3011, Genetics and Laboratory 4

BIO 3023, Principles of Ecology 3

BIO 4021, Biological Seminar 1

CHEM 1023 AND 1021, General Chemistry II and Laboratory 4

CHEM 3103 AND 3101, Organic Chemistry I and Laboratory 4

CHEM 3113 AND 3111, Organic Chemistry II and Laboratory 4

MATH 2194, Survey of Calculus OR

MATH 2204, Calculus I

4

PHYS 2054, General Physics I 4

PHYS 2064, General Physics II 4

Sub-total 40

Emphasis Area (Zoology): Sem. Hrs.

BIO 4324, Comparative Vertebrate Anatomy 4

BIO 3303 AND 3301, General Entomology and Laboratory OR

BIO 3322 AND 3332, Invertebrate Zoology and Laboratory

4

BIO 4443 AND 4441, Comparative Animal Physiology and Laboratory 4

BIO 4332 AND 4342, Animal Histology and Laboratory 4

BIO 4343 AND 4341, Animal Embryology and Laboratory 4

STAT 3233, Applied Statistics I OR

CHEM 4243, Biochemistry

3

CURRENT VERSION (pg. 427)

Major in Wildlife, Fisheries and Conservation (cont.)

Bachelor of Science

Emphasis in Fisheries

A complete 8-semester degree plan is available at https://www.astate.edu/info/academics/degrees/

Botany elective:

BIO 3542 AND BIO 3541, Plant Pathology and Laboratory

BIO 3553. Economic Botany

BIO 4513. Plant Physiology

BIO 4522 AND BIO 4521, Wetland Plant Ecology and Laboratory

BIO 4542 AND BIO 4541, Mycology and Laboratory

BIO 4552 AND BIO 4551, Medical Mycology and Laboratory

BIO 4704. Plant Systematics

BIO 4714, Dendrology

Other courses approved by advisor

3-4

Zoology elective:

BIO 3303 AND BIO 3301, General Entomology and Laboratory

BIO 3313 AND BIO 3311, Economic Entomology and Laboratory

BIO 3302 AND BIO 3312, Comparative Anatomy and Laboratory

BIO 3322 AND BIO 3332, Invertebrate Zoology and Laboratory

BIO 4332 AND BIO 4342, Animal Histology and Laboratory

BIO 4333, Marine Biology

BIO 4343 AND BIO 4341, Animal Embryology and Laboratory

BIO 4354, Mammology

BIO 4362, Applied Aquaculture

BIO 4363 AND BIO 4361, Mammalian Neurobiology and Laboratory

BIO 4372, Applied Fisheries

BIO 4373 AND 4371, Animal Ecology and Laboratory

BIO 4382 AND BIO 4392, Parasitology and Laboratory

BIO 4403, Comparative Vertebrate Reproduction

BIO 4453 AND BIO 4451, Herpetology and Laboratory

BIO 4423 AND BIO 4421, Ornithology and Laboratory

BIO 4433, Field Experience in Marine Environments

BIO 4443 AND 4441, Comparative Animal Physiology and Laboratory

NOTE: An individual course cannot be used as both a required course and an elective.

3-5

Electives:

Choose from Botany and/or Zoology electives above.

NOTE: An individual course cannot be used as both a required course and an elective.

7-10

Sub-total 81

Total Required Hours: 120

REVISED VERSION:

Major in Wildlife, Fisheries and Conservation (cont.)

Bachelor of Science

Emphasis in Fisheries

A complete 8-semester degree plan is available at https://www.astate.edu/info/academics/degrees/

Botany elective:

BIO 3542 AND BIO 3541, Plant Pathology and Laboratory

BIO 3553. Economic Botany

BIO 4513. Plant Physiology

BIO 4522 AND BIO 4521, Wetland Plant Ecology and Laboratory

BIO 4542 AND BIO 4541, Mycology and Laboratory

BIO 4552 AND BIO 4551, Medical Mycology and Laboratory

BIO 4704. Plant Systematics

BIO 4714, Dendrology

Other courses approved by advisor

3-4

Zoology elective:

BIO 3303 AND BIO 3301, General Entomology and Laboratory

BIO 3313 AND BIO 3311, Economic Entomology and Laboratory

BIO 4324, Comparative Vertebrate Anatomy

BIO 3322 AND BIO 3332, Invertebrate Zoology and Laboratory

BIO 4332 AND BIO 4342, Animal Histology and Laboratory

BIO 4333, Marine Biology

BIO 4343 AND BIO 4341, Animal Embryology and Laboratory

BIO 4354, Mammology

BIO 4362, Applied Aquaculture

BIO 4363 AND BIO 4361, Mammalian Neurobiology and Laboratory

BIO 4372, Applied Fisheries

BIO 4373 AND 4371, Animal Ecology and Laboratory

BIO 4382 AND BIO 4392, Parasitology and Laboratory

BIO 4403, Comparative Vertebrate Reproduction

BIO 4453 AND BIO 4451, Herpetology and Laboratory

BIO 4423 AND BIO 4421, Ornithology and Laboratory

BIO 4433, Field Experience in Marine Environments

BIO 4443 AND 4441, Comparative Animal Physiology and Laboratory

NOTE: An individual course cannot be used as both a required course and an elective.

3-5

Electives:

Choose from Botany and/or Zoology electives above.

NOTE: An individual course cannot be used as both a required course and an elective.

7-10

Sub-total 81

Total Required Hours: 120

CURRENT VERSION (pg. 429)

The bulletin can be accessed at https://www.astate.edu/a/registrar/students/bulletins/

Select two of the following:

BIO 3673, Human Dimensions of Natural Resources

BIO 4613, Conservation Biology

POSC 4633, Environmental Law and Administration

6

Select two of the following:

BIO 4354, Mammalogy

BIO 4453 AND 4411, Herpetology and Laboratory

BIO 4423 AND 4421, Ornithology and Laboratory

8

Botany elective:

BIO 3501 AND BIO 3511, Wild Flowers of Arkansas and Laboratory.

BIO 3542 AND BIO 3541, Plant Pathology and Laboratory

BIO 3553. Economic Botany

BIO 4513. Plant Physiology

BIO 4522 AND BIO 4521, Wetland Plant Ecology and Laboratory

BIO 4542 AND BIO 4541, Mycology and Laboratory

BIO 4552 AND BIO 4551, Medical Mycology and Laboratory

BIO 4714, Dendrology

Other courses approved by advisor

3

Communication elective:

ENG 3063, Writing for STEM

See advisor for acceptable substitutions.

3

Zoology electives:

BIO 3303 AND BIO 3301, General Entomology and Laboratory

BIO 3313 AND BIO 3311, Economic Entomology and Laboratory

BIO 3302 AND BIO 3312, Comparative Anatomy and Laboratory

BIO 3322 AND BIO 3332, Invertebrate Zoology and Laboratory

BIO 4332 AND BIO 4342, Animal Histology and Laboratory

BIO 4333, Marine Biology

BIO 4343 AND BIO 4341, Animal Embryology and Laboratory

BIO 4354, Mammology

BIO 4362, Applied Aquaculture

BIO 4363 AND BIO 4361, Mammalian Neurobiology and Laboratory

BIO 4372, Applied Fisheries

BIO 4382 AND BIO 4392, Parasitology and Laboratory

BIO 4403, Comparative Vertebrate Reproduction

BIO 4453 AND BIO 4451, Herpetology and Laboratory

BIO 4423 AND BIO 4421, Ornithology and Laboratory

BIO 4433, Field Experience in Marine Environments

BIO 4443 AND 4441, Comparative Animal Physiology and Laboratory

An individual course cannot be used as both a required course and an elective.

4-5

Sub-total 81

Total Required Hours: 120

REVISED VERSION:

The bulletin can be accessed at https://www.astate.edu/a/registrar/students/bulletins/

Select two of the following:

BIO 3673, Human Dimensions of Natural Resources

BIO 4613, Conservation Biology

POSC 4633, Environmental Law and Administration

6

Select two of the following:

BIO 4354, Mammalogy

BIO 4453 AND 4411, Herpetology and Laboratory

BIO 4423 AND 4421, Ornithology and Laboratory

8

Botany elective:

BIO 3501 AND BIO 3511, Wild Flowers of Arkansas and Laboratory.

BIO 3542 AND BIO 3541, Plant Pathology and Laboratory

BIO 3553. Economic Botany

BIO 4513. Plant Physiology

BIO 4522 AND BIO 4521, Wetland Plant Ecology and Laboratory

BIO 4542 AND BIO 4541, Mycology and Laboratory

BIO 4552 AND BIO 4551, Medical Mycology and Laboratory

BIO 4714, Dendrology

Other courses approved by advisor

3

Communication elective:

ENG 3063, Writing for STEM

See advisor for acceptable substitutions.

3

Zoology electives:

BIO 3303 AND BIO 3301, General Entomology and Laboratory

BIO 3313 AND BIO 3311, Economic Entomology and Laboratory

BIO 4324, Comparative Vertebrate Anatomy

BIO 3322 AND BIO 3332, Invertebrate Zoology and Laboratory

BIO 4332 AND BIO 4342, Animal Histology and Laboratory

BIO 4333, Marine Biology

BIO 4343 AND BIO 4341, Animal Embryology and Laboratory

BIO 4354, Mammology

BIO 4362, Applied Aquaculture

BIO 4363 AND BIO 4361, Mammalian Neurobiology and Laboratory

BIO 4372, Applied Fisheries

BIO 4382 AND BIO 4392, Parasitology and Laboratory

BIO 4403, Comparative Vertebrate Reproduction

BIO 4453 AND BIO 4451, Herpetology and Laboratory

BIO 4423 AND BIO 4421, Ornithology and Laboratory

BIO 4433, Field Experience in Marine Environments

BIO 4443 AND 4441, Comparative Animal Physiology and Laboratory

An individual course cannot be used as both a required course and an elective.

4-5

Sub-total 81

Total Required Hours: 120

CURRENT VERSION (pg.470)

**BIO 3231. Human Structure and Function II Laboratory** Two hours per week. Special course fees may apply. It is recommended this course be taken concurrently with BIO 3233. Fall, Spring.

**BIO 3233. Human Structure and Function II** This course covers the structure and func­tion of the human organism. Topics covered include special senses and endocrine, respiratory, cardiovascular, digestive, urinary, reproductive and integumentary systems. Special course fees may apply. Prerequisites, BIO 3223 and BIO 3221. Fall, Spring.

**BIO 3241. Physical Diagnosis** This course provides an introduction to clinical medi­cine for pre-medical students by teaching the basics of physical examination. Prerequisite, BIO 1303 and BIO 1301. Enrollment limited to pre-medical students. Special course fees may apply. Graded pass or fail, credit cannot be applied to degree requirements. Fall.

**BIO 3251. Introduction to Pathology** This course introduces pre-medical students to presentation, physical findings, etiology and basic treatment of a number of common diseases and conditions. Special course fees may apply. Prerequisite, BIO 1303 and BIO 1301. Enroll­ment limited to pre-medical students. Graded pass or fail, credit cannot be applied to degree requirements. Spring.

**BIO 3261. Health Coaching I** Opportunities for pre-medical students to better understand and practice concepts of healthcare, especially the interactions of a health care provider and the patient. Prerequisite, BIO 3251 and instructor permission. Graded pass or fail. Fall.

**BIO 3271. Health Coaching II** Extensive practical experience for pre-medical students working as facilitators for health care providers and their patients. Prerequisite, BIO 3261 and instructor permission. Graded pass or fail. Spring.

**BIO 3301. General Entomology Laboratory** Two hours per week. It is recommended this course be taken concurrently with BIO 3303. Special course fees may apply. Fall.

**BIO 3302. Comparative Anatomy** Chordate morphology, phylogeny, ontogeny, organolo­gy, and homology. Lecture two hours per week. Special course fees may apply. Prerequisites, BIO 1301 and BIO 1303. Fall, odd.

**BIO 3303. General Entomology** Identification, structure, and life history of the principal insect orders. Lecture three hours per week. Special course fees may apply. Prerequisites, BIO 1301 and BIO 1303. Fall.

**BIO 3311. Economic Entomology Laboratory** Two hours per week. It is recommended this course be taken concurrently with BIO 3313. Special course fees may apply. Spring.

**BIO 3312. Comparative Anatomy Laboratory** Four hours per week. Special course fees may apply. To be taken concurrently with BIO 3302. Fall, odd.

**BIO 3313. Economic Entomology** Life history, distribution, and control of injurious insects. Lecture three hours per week. Special course fees may apply. Prerequisites, BIO 1301 and BIO 1303. Spring.

**BIO 3322. Invertebrate Zoology** Classification and natural history of representative invertebrates. Lecture two hours per week. Special course fees may apply. Prerequisites, BIO 1301 and BIO 1303. Spring.

**BIO 3332. Invertebrate Zoology Laboratory** Four hours per week. Special course fees may apply. To be taken concurrently with BIO 3322. Spring.

**BIO 3501. Wild Flowers of Arkansas** Identification and conservation of wild flowers in Arkansas, plus studying those that are edible, endangered or rare, poisonous, or may be used in flower gardens. Lecture one hour per week. Open to all majors. Special course fees may apply.

**BIO 3511. Wild Flowers of Arkansas Laborator**y Two hours per week. To be taken con­currently with BIO 3501. Special course fees may apply.

REVISED VERSION:

**BIO 3231. Human Structure and Function II Laboratory** Two hours per week. Special course fees may apply. It is recommended this course be taken concurrently with BIO 3233. Fall, Spring.

**BIO 3233. Human Structure and Function II** This course covers the structure and func­tion of the human organism. Topics covered include special senses and endocrine, respiratory, cardiovascular, digestive, urinary, reproductive and integumentary systems. Special course fees may apply. Prerequisites, BIO 3223 and BIO 3221. Fall, Spring.

**BIO 3241. Physical Diagnosis** This course provides an introduction to clinical medi­cine for pre-medical students by teaching the basics of physical examination. Prerequisite, BIO 1303 and BIO 1301. Enrollment limited to pre-medical students. Special course fees may apply. Graded pass or fail, credit cannot be applied to degree requirements. Fall.

**BIO 3251. Introduction to Pathology** This course introduces pre-medical students to presentation, physical findings, etiology and basic treatment of a number of common diseases and conditions. Special course fees may apply. Prerequisite, BIO 1303 and BIO 1301. Enroll­ment limited to pre-medical students. Graded pass or fail, credit cannot be applied to degree requirements. Spring.

**BIO 3261. Health Coaching I** Opportunities for pre-medical students to better understand and practice concepts of healthcare, especially the interactions of a health care provider and the patient. Prerequisite, BIO 3251 and instructor permission. Graded pass or fail. Fall.

**BIO 3271. Health Coaching II** Extensive practical experience for pre-medical students working as facilitators for health care providers and their patients. Prerequisite, BIO 3261 and instructor permission. Graded pass or fail. Spring.

**BIO 3301. General Entomology Laboratory** Two hours per week. It is recommended this course be taken concurrently with BIO 3303. Special course fees may apply. Fall.

**BIO 3303. General Entomology** Identification, structure, and life history of the principal insect orders. Lecture three hours per week. Special course fees may apply. Prerequisites, BIO 1301 and BIO 1303. Fall.

**BIO 3311. Economic Entomology Laboratory** Two hours per week. It is recommended this course be taken concurrently with BIO 3313. Special course fees may apply. Spring.

**BIO 4324. Comparative Vertebrate Anatomy** The functional morphology of chordates, with emphasis on those with backbones. Anatomical structures are presented with a focus on phylogeny, ontogeny, and structural homology. Lecture two hours and lab four hours per week. Special course fees apply. Prerequisites, BIO 1301, 1303, 2011 and 2013. Fall.

**BIO 3313. Economic Entomology** Life history, distribution, and control of injurious insects. Lecture three hours per week. Special course fees may apply. Prerequisites, BIO 1301 and BIO 1303. Spring.

**BIO 3322. Invertebrate Zoology** Classification and natural history of representative invertebrates. Lecture two hours per week. Special course fees may apply. Prerequisites, BIO 1301 and BIO 1303. Spring.

**BIO 3332. Invertebrate Zoology Laboratory** Four hours per week. Special course fees may apply. To be taken concurrently with BIO 3322. Spring.

**BIO 3501. Wild Flowers of Arkansas** Identification and conservation of wild flowers in Arkansas, plus studying those that are edible, endangered or rare, poisonous, or may be used in flower gardens. Lecture one hour per week. Open to all majors. Special course fees may apply.

**BIO 3511. Wild Flowers of Arkansas Laborator**y Two hours per week. To be taken con­currently with BIO 3501. Special course fees may apply

CURRENT VERSION (pg. 473):

**BIO 4301. Aquatic Entomology** Identification, life histories, and ecology of aquatic arthropods, with emphasis on freshwater insects. For students in wildlife management, fisheries management, aquatic biology, and advanced entomology. Lecture one hour per week. Special course fees may apply. Prerequisites, BIO 3301, BIO 3303, and BIO 3123 or BIO 4371 and BIO 4373.

**BIO 4302. Aquatic Entomology Laboratory** Four hours per week. Special course fees may apply. To be taken concurrently with BIO 4301.

**BIO 4311. Fisheries Biology** Identification, ecology, food habits, management, and behavior of fishes. Lecture one hour per week. Special course fees may apply. Prerequisites, BIO 1303 and BIO 1301.

**BIO 4312. Fisheries Biology Laboratory** Four hours per week. To be taken concur­rently with BIO 4311. Special course fees may apply.

**BIO 4332. Animal Histology** Cells and tissues of the organ systems of vertebrates. Lecture two hours per week. Special course fees may apply. Prerequisites, BIO 3302 and BIO 3312.

**BIO 4333. Marine Biology** Overview of the diverse discipline of marine biology. Empha­sis on life history but will incorporate aspects of chemistry, microbiology, molecular biology, and ecology of marine systems. Also includes marine fisheries, conservation biology, aquaculture, pharmacology, resource management, and public policy. Special course fees may apply. Prereq­uisites, BIO 1303 and BIO 1301 or BIOL 1003 and 1001, and BIO 3023, or instructor permission. Dual listed BIO 5333. Spring.

**BIO 4341. Animal Embryology Laboratory** Two hours per week. Special course fees may apply. To be taken concurrently with BIO 4343. Spring.

**BIO 4342. Animal Histology Laboratory** Four hours per week. Special course fees may apply. To be taken concurrently with BIO 4332.

**BIO 4343. Animal Embryology** Study of reproduction and development in animals including reproductive systems, gamete formation, fertilization, early cleavage, formation of germ layers, and development of the organ systems. Lecture three hours per week. Special course fees may apply. To be taken concurrently with BIO 4341. Prerequisites, BIO 1301 and BIO 1303. Spring.

**BIO 4354. Mammalogy** Evolution, phylogenetics, biogeography, structure, ecology, taxonomy, and field techniques of mammals. Special course fees may apply. Lecture three hours and lab three hours per week. Prerequisites, “C” or better in both BIO 1301 and BIO 1303.

**BIO 4361. Mammalian Neurobiology Laboratory** Two hours per week. Special course fees may apply. To be taken concurrently with BIO 4363.

**BIO 4362. Applied Aquaculture** Field course in which principles of aquaculture are ap­plied within several public and private enterprises. Intended for the student interested in wildlife, fisheries biology, and agriculture. Special course fees may apply. Prerequisites, BIO 4311 and BIO 4312.

**BIO 4363. Mammalian Neurobiology** A detailed study of the mammalian nervous sys­tem with particular emphasis on morphological aspects. Lecture three hours per week. Special course fees may apply. Prerequisites, BIO 1301 and BIO 1303, or BIO 2223 and BIO 2221, or instructor permission.

**BIO 4371. Animal Ecology Laboratory** Two hours per week. Special course fees may apply. To be taken concurrently with BIO 4373. Fall, odd.

**BIO 4372. Applied Fisheries** Field course in which principles are applied within several fisheries management settings. Intended for the Wildlife Ecology and Management major. Spe­cial course fees may apply. Prerequisite, BIO 4311.

**BIO 4373. Animal Ecology** The relationship of animals to their chemical, physical, and biological environment, and the distribution of animal life. Lecture three hours per week. Spe­cial course fees may apply. Prerequisites, BIO 3023. Fall.

REVISED VERSION:

**BIO 4301. Aquatic Entomology** Identification, life histories, and ecology of aquatic arthropods, with emphasis on freshwater insects. For students in wildlife management, fisheries management, aquatic biology, and advanced entomology. Lecture one hour per week. Special course fees may apply. Prerequisites, BIO 3301, BIO 3303, and BIO 3123 or BIO 4371 and BIO 4373.

**BIO 4302. Aquatic Entomology Laboratory** Four hours per week. Special course fees may apply. To be taken concurrently with BIO 4301.

**BIO 4311. Fisheries Biology** Identification, ecology, food habits, management, and behavior of fishes. Lecture one hour per week. Special course fees may apply. Prerequisites, BIO 1303 and BIO 1301.

**BIO 4312. Fisheries Biology Laboratory** Four hours per week. To be taken concur­rently with BIO 4311. Special course fees may apply.

**BIO 4332. Animal Histology** Cells and tissues of the organ systems of vertebrates. Lecture two hours per week. Special course fees may apply. Prerequisite, BIO 4324.

**BIO 4333. Marine Biology** Overview of the diverse discipline of marine biology. Empha­sis on life history but will incorporate aspects of chemistry, microbiology, molecular biology, and ecology of marine systems. Also includes marine fisheries, conservation biology, aquaculture, pharmacology, resource management, and public policy. Special course fees may apply. Prereq­uisites, BIO 1303 and BIO 1301 or BIOL 1003 and 1001, and BIO 3023, or instructor permission. Dual listed BIO 5333. Spring.

**BIO 4341. Animal Embryology Laboratory** Two hours per week. Special course fees may apply. To be taken concurrently with BIO 4343. Spring.

**BIO 4342. Animal Histology Laboratory** Four hours per week. Special course fees may apply. To be taken concurrently with BIO 4332.

**BIO 4343. Animal Embryology** Study of reproduction and development in animals including reproductive systems, gamete formation, fertilization, early cleavage, formation of germ layers, and development of the organ systems. Lecture three hours per week. Special course fees may apply. To be taken concurrently with BIO 4341. Prerequisites, BIO 1301 and BIO 1303. Spring.

**BIO 4354. Mammalogy** Evolution, phylogenetics, biogeography, structure, ecology, taxonomy, and field techniques of mammals. Special course fees may apply. Lecture three hours and lab three hours per week. Prerequisites, “C” or better in both BIO 1301 and BIO 1303.

**BIO 4361. Mammalian Neurobiology Laboratory** Two hours per week. Special course fees may apply. To be taken concurrently with BIO 4363.

**BIO 4362. Applied Aquaculture** Field course in which principles of aquaculture are ap­plied within several public and private enterprises. Intended for the student interested in wildlife, fisheries biology, and agriculture. Special course fees may apply. Prerequisites, BIO 4311 and BIO 4312.

**BIO 4363. Mammalian Neurobiology** A detailed study of the mammalian nervous sys­tem with particular emphasis on morphological aspects. Lecture three hours per week. Special course fees may apply. Prerequisites, BIO 1301 and BIO 1303, or BIO 2223 and BIO 2221, or instructor permission.

**BIO 4371. Animal Ecology Laboratory** Two hours per week. Special course fees may apply. To be taken concurrently with BIO 4373. Fall, odd.

**BIO 4372. Applied Fisheries** Field course in which principles are applied within several fisheries management settings. Intended for the Wildlife Ecology and Management major. Spe­cial course fees may apply. Prerequisite, BIO 4311.

**BIO 4373. Animal Ecology** The relationship of animals to their chemical, physical, and biological environment, and the distribution of animal life. Lecture three hours per week. Spe­cial course fees may apply. Prerequisites, BIO 3023. Fall.