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

**Course Revision Proposal Form**

**[X] Undergraduate Curriculum Council**

**[ ] Graduate Council**

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

Email completed proposals to [curriculum@astate.edu](mailto:curriculum@astate.edu) for inclusion in curriculum committee agenda.

|  |  |
| --- | --- |
| David F. Gilmore 2/21/2019 **Department Curriculum Committee Chair** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date…  **COPE Chair (if applicable)** |
| Travis D. Marsico 2/21/2019 **Department Chair** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date…  **Head of Unit (If applicable)** |
| David F. Gilmore 2/22/2019 **College Curriculum Committee Chair** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date…  **Undergraduate Curriculum Council Chair** |
| Anne A. Grippo 2/22/2019 **College Dean** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date…  **Graduate Curriculum Committee Chair** |
| |  |  | | --- | --- | | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Enter date |   **General Education Committee Chair (If applicable)** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date…  **Vice Chancellor for Academic Affairs** |

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

Dr. Lorin Neuman-Lee [lneumanlee@astate.edu](mailto:lneumanlee@astate.edu)

870-972-3111

2. Proposed Starting Term and Bulletin Year for Change to Take Effect

2019-2020, Fall

3. Current Course Prefix and Number

BIO 3323

3.1 – **[YES]** Request for Course Prefix and Number change

If yes, include new course Prefix and Number below. *(Confirm that number chosen has not been used before. For variable credit courses, indicate variable range. Proposed number for experimental course is 9. )*

BIO 4443

3.2 – **Yes / No** If yes, has it been confirmed that this course number is available for use?

*If no: Contact Registrar’s Office for assistance.*

4. Current Course Title

Animal Physiology

4.1 – **[YES]** Request for Course Title Change

If yes, include new Course Title Below.

Comparative Animal Physiology

1. If title is more than 30 characters (including spaces), provide short title to be used on transcripts. *Title cannot have any symbols (e.g. slash, colon, semi-colon, apostrophe, dash, and parenthesis).*

NA

1. Please indicate if this course will have variable titles (e.g. independent study, thesis, special topics).

NO

5. – **[YES ]** Request for Course Description Change.

If yes, please include brief course description (40 words or fewer) as it should appear in the bulletin.

Examination of physiological systems and processes across vertebrate and invertebrate groups. Broad topics include energetic relationships, integrating systems, reproduction, internal transport, and maintenance of internal balance.

6. – [YES] Request for prerequisites and major restrictions change.

*(If yes, 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?

Add BIO 2013; Keep BIO 1301, BIO 1303, CHEM 1013

* 1. Why or why not?

Adding BIO 2013 (Biology of the Cell) to ensure basic understanding of cell biology before starting physiological course work

1. NO Is this course restricted to a specific major?
   1. If yes, which major? Enter text...

7. – [YES ] Request for Course Frequency Change(e.g. Fall, Spring, Summer). *Not applicable to Graduate courses.*

a. If yes, please indicate current and new frequency:

currently, Spring, Proposed: Fall, odd years

8. – [NO ] Request for Class Mode Change

*If yes, indicate if this course will be lecture only, lab only, lecture and lab, activity, dissertation, experiential learning, independent study, internship, performance, practicum, recitation, seminar, special problems, special topics, studio, student exchange, occupational learning credit, or course for fee purpose only (e.g. an exam)? Please* *indicate the current and choose one.*

Enter text...

9. – [NO ] Request for grade type change

*If yes, what is the current and the new grade type (i.e. standard letter, credit/no credit, pass/fail, no grade, developmental, or other [please elaborate])*

Enter text...

10. YES Is this course dual listed (undergraduate/graduate)?

a. If yes, indicate course prefix, number and title of dual listed course.

BIO 5443 Comparative Animal Physiology

11. 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.)*

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

Enter text...

**11.2** – **Yes / No** Are these courses offered for equivalent credit?

Please explain. Enter text...

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

a. If yes, what program?

Enter text...

13. YES Does this course replace a course being deleted?

a. If yes, what course?

BIO 3323 Animal Physiology

14. YES Will this course be equivalent to a deleted course or the previous version of the course?

a. If yes, which course?

It will have the equivalent purpose as the previous animal physiology course (BIO 3323)

15. YES Does this course affect another program?

If yes, provide confirmation of acceptance/approval of changes from the Dean, Department Head, and/or Program Director whose area this affects.

Contacted Cognitive Science Minor in Philosophy, approved.

16. Does this course require course fees?

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

**Revision Details**

17. Please outline the proposed revisions to the course.

*Include information as to any changes to course outline, special features, required resources, or in academic rationale and goals for the course.*

This course will be offered as a graduate/undergraduate course now and will be increasing to a 4000 level course because it will require students to be advanced in their degree and able to critically think and understand scientific literature. There will be more integrating of primary literature into this course. There will also be more integration of creative aspects, such as artwork and oral communication to a broad audience.

18. Please provide justification to the proposed changes to the course.

This is increasing the level of difficulty for the course because it is required for students to have a basic understanding of biological processes as well as the ability to critically apply their biological knowledge to comparative systems. Further, we will be reading scientific papers and students must have a level of understanding to comprehend and analyze these papers for discussion. Additionally, this course will be beneficial for graduate students and cannot be dual listed as a 3000 level course.

19. NO Do these revisions result in a change to the assessment plan?

While these revisions should not demonstratively change the assessment plan, we have explicitly listed the assessment below.

*\*If yes: Please complete the Assessment section of the proposal on the next page.*

*\*If no: Skip to Bulletin Changes section of the proposal.*

***\*See question 19 before completing the Assessment portion of this proposal.***

**Assessment**

**Relationship with Current Program-Level Assessment Process**

22. 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?

23. Considering the indicated program-level learning outcome/s (from question #23), 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 #23)** |  |
| Assessment Measure |  |
| Assessment  Timetable |  |
| Who is responsible for assessing and reporting on the results? |  |
| **Program-Level Outcome 2 (from question #23)** |  |
| Assessment Measure |  |
| Assessment  Timetable |  |
| Who is responsible for assessing and reporting on the results? |  |
| **Program-Level Outcome 3 (from question #23)** |  |
| Assessment Measure |  |
| Assessment  Timetable |  |
| Who is responsible for assessing and reporting on the results? |  |

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

**Course-Level Outcomes**

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

|  |  |
| --- | --- |
| **Outcome 1** |  |
| Which learning activities are responsible for this outcome? |  |
| Assessment Measure |  |

|  |  |
| --- | --- |
| **Outcome 2** |  |
| Which learning activities are responsible for this outcome? |  |
| Assessment Measure |  |

|  |  |
| --- | --- |
| **Outcome 3** |  |
| Which learning activities are responsible for this outcome? |  |
| Assessment Measure |  |

|  |  |
| --- | --- |
| **Outcome 4** |  |
| Which learning activities are responsible for this outcome? |  |
| Assessment Measure |  |

**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. Follow the following guidelines for indicating necessary changes.**  **\*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.**  - Deleted courses/credit hours should be marked with a red strike-through (~~red strikethrough~~)  - New credit hours and text changes should be listed in blue using enlarged font (blue using enlarged font).  - Any new courses should be listed in blue bold italics using enlarged font (***blue bold italics using enlarged font***)  *You can easily apply any of these changes by selecting the example text in the instructions above, double-clicking the ‘format painter’ icon 🡪 , and selecting the text you would like to apply the change to.*  *Please visit* [*https://youtu.be/yjdL2n4lZm4*](https://youtu.be/yjdL2n4lZm4) *for more detailed instructions.* |

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, Summer.

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, Summer.

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 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 3321. Animal Physiology Laboratory   Three hours per week. Special course fees may apply. To be taken concurrently with BIO 3323. 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, even.

~~BIO 3323. Animal Physiology Chemical, physical, and biological functions of systems, including the study of metabolism and inter relationships of organ systems to the entire organism. Lecture three hours per week. Special course fees may apply. Prerequisites, BIO 1301, BIO 1303, CHEM 1021, and 1023. Spring.~~

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

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. Summer, odd every 4 years.

BIO 3511. Wild Flowers of Arkansas Laboratory   Two hours per week. To be taken concurrently with BIO 3501. Special course fees may apply. Summer, odd every 4 years.

BIO 3541. Plant Pathology Laboratory   Two hours per week. To be taken concurrently with BIO 3542. Special course fees may apply. Spring, odd.

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, odd.

BIO 4382. Parasitology Parasites of vertebrates and plants, with emphasis on protozoan and helminth parasites of man and domestic animals. Lecture two hours per week. Special course fees may apply. Prerequisites, BIO 1301 and BIO 1303. Spring.

BIO 4392. Parasitology Laboratory   Four hours per week. Special course fees may apply. To be taken concurrently with BIO 4382. Spring.

BIO 4401. Ichthyology Laboratory   Two hours per week. Special course fees may apply. To be taken concurrently with BIO 4402. Fall, even.

BIO 4402. Ichthyology   Taxonomy, distribution, natural history, and economic importance of fishes, with emphasis on Arkansas species. Lecture two hours per week. Special course fees may apply. Prerequisites, BIO 1301 and BIO 1303. Fall, even.

BIO 4403. Comparative Vertebrate Reproduction   This combined lecture and lab course surveys major events in the vertebrate reproductive cycles and patterns. Special course fees may apply. Prerequisites, BIO 3231 and BIO 3233, or BIO 3323 and 3321. Dual Listed BIO 5403. Fall even.

BIO 4411. Herpetology Laboratory   Two hours per week. Special course fees may apply. To be taken concurrently with BIO 4412. Spring, even.

BIO 4412. Herpetology   Collection, identification, classification, distribution, economic importance, and life histories of amphibians and reptiles, with emphasis on Arkansas species. Lecture two hours per week. Special course fees may apply. Prerequisites, BIO 1301 and 1303. Spring, even.

BIO 4413. Wildlife Program Internship Participation in a professional wildlife educational, management or research program activity. Internship is arranged by the student and may be a volunteer or paid position. Entails a minimum of 160 work hours. Special course fees may apply. Must be approved by advisor or chair. Fall, Spring, Summer. BIO 4421. Ornithology Laboratory   Three hours per week. Special course fees may apply. To be taken concurrently with BIO 4423. Spring, even.

BIO 4423. Ornithology   Morphology, physiology, taxonomy, behavior, ecology, natural history, zoogeography, and evolution of birds. Lecture three hours per week. Special course fees may apply. Prerequisites, BIO 1301 and BIO 1303. Spring, even.

BIO 4433. Field Experience in Marine Environments   Hands on experience with living and non living components of environments. Emphasis on marine organisms and habitats but will incorporate human interactions associated with marine environments. Course is comprised of an intensive 12 day, 10 hours a day, field trip to an appropriate marine environment. Special course fees may apply. Prerequisites, BIO 4333, or BIOL 1003 and BIOL 1001, or permission of instructor.

BIO 4441 **Comparative Animal Physiology Laboratory** Three hours per week. Special course fees may apply. To be taken concurrently with BIO 4443. Fall, odd.

BIO 4443 **Comparative Animal Physiology** Examination of physiological systems and processes across vertebrate and invertebrate groups. Broad topics include energetic relationships, integrating systems, reproduction, internal transport, and maintenance of internal balance. Prerequisites, BIO 1301, BIO 1303, BIO 2013, CHEM 1021, and CHEM 1023. Dual Listed BIO 5443. Fall, odd.

BIO 4513. Plant Physiology General principles of conduction, cellular reactions, respiration, growth, photosynthesis, movement, hormones, and metabolism in plants. Lecture three hours per week. Special course fees may apply. Prerequisites, BIO 1501, BIO 1503, and CHEM 2064 or 3103 and 3101. Spring, even.

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**Department of English and Philosophy Minors**

**Minor in Cognitive Science**

Completion of the minor will require eighteen hours in courses related to cognition, learning, development and the mind - at least nine of which must be upper-level courses, and no more than six of which are in the student’s major. Students must also complete courses from two of the three main research areas of Psychology, Philosophy and Biology.

|  |  |
| --- | --- |
| **Required Courses:** | **Sem. Hrs.** |
| PHIL 2403, Introduction to Cognitive Science | 3 |
| **Select fifteen hours from the following:**  BIO 3033, Evolution ~~BIO 3323~~ **~~AND~~** ~~3231, Animal Physiology and Laboratory~~  BIO 4133 **AND** 4131, Cell Biology and Laboratory BIO 4443 **AND** BIO 4441, Comparative Animal Physiology and Laboratory  PHIL 4403, Metaphysics PHIL 4443, Philosophy of Mind POSC 4003, Political Psychology PSY 3043, Child Psychology PSY 3303, Motivation PSY 3413, Adolescent Psychology PSY 3453, Developmental Psychology PSY 4323, Physiological Psychology PSY 4363, Cognitive Psychology SOC 3293, Self and Society SOC 4213, Sociology of Childhood and Adolescence | 15 |
| **Total Required Hours:** | **18** |

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**Major in Biological Sciences (cont.)**

**Bachelor of Science  
Emphasis in Biology**A complete 8-semester degree plan is available at https://www.astate.edu/info/academics/degrees/

|  |  |
| --- | --- |
| **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 3323~~ **~~AND~~** ~~3321, Animal Physiology and Laboratory~~  BIO 4443 **AND** BIO 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 |
|  | 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** |

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**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. 44) |  |
| **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. 89)  **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 3323~~ **~~AND~~** ~~3321, Animal Physiology and Laboratory~~ BIO 4443 **AND** BIO 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 |

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**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. 44) | |  |
| **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. 89)  **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 3323~~ **~~AND~~** ~~3321, Animal Physiology and Laboratory~~ | | ~~4~~ |
| BIO 4332 **AND** 4342, Animal Histology and Laboratory | | 4 |
| BIO 4343 **AND** 4341, Animal Embryology and Laboratory | | 4 |
| BIO 4443 **AND** BIO 4441, Comparative Animal Physiology and Laboratory | 4 |
| STAT 3233, Applied Statistics I **OR** CHEM 4243, Biochemistry | | 3 |

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**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/

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| **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 3323~~ **~~AND~~** ~~BIO 3321, Animal Physiology and Laboratory~~ BIO 4443 **AND** BIO 4441, Comparative Animal Physiology and Laboratory BIO 4322 **AND** BIO 4323, Biology of Marine Mammals 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 4352 **AND** BIO 4351, Mammology and Laboratory 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 4412 **AND** BIO 4411, Herpetology and Laboratory BIO 4423 **AND** BIO 4421, Ornithology and Laboratory BIO 4433, Field Experience in Marine Environments *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.  *An individual course cannot be used as both a required course and an elective.* | 7-10 |
| **Sub-total** | **81** |
| **Total Required Hours:** | **120** |

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**Major in Wildlife, Fisheries and Conservation (cont.)**

**Bachelor of Science**

**Emphasis in Wildlife**

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

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| **Select two of the following:**  BIO 3673, Human Dimensions of Natural Resources BIO 4613, Conservation Biology POSC 4533, Environmental Law and Administration | 6 |
| **Select two of the following:** BIO 4352 **AND** 4351, Mammalogy and Laboratory BIO 4412 **AND** 4411, Herpetology and Laboratory BIO 4423 **AND** 4421, Ornithology and Laboratory | 6-7 |
| **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 3043. Technical Writing  *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 3323~~ **~~AND~~** ~~BIO 3321, Animal Physiology and Laboratory~~ BIO 4322 **AND** BIO 4323, Biology of Marine Mammals 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 4352 **AND** BIO 4351, Mammology and Laboratory 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 4412 **AND** BIO 4411, Herpetology and Laboratory BIO 4423 **AND** BIO 4421, Ornithology and Laboratory BIO 4433, Field Experience in Marine Environments BIO 4443 **AND** BIO 4441, Comparative Animal Physiology and Laboratory *An individual course cannot be used as both a required course and an elective.* | 5-7 |
| **Sub-total** | **81** |
| **Total Required Hours:** | **120** |

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BIO 4403. Comparative Vertebrate Reproduction   This combined lecture and lab course surveys major events in the vertebrate reproductive cycles and patterns. Special course fees may apply. Prerequisites, BIO 3231 and BIO 3233, or **~~BIO 3323 and 3321~~ BIO 4443 and BIO 4441**. Dual Listed BIO 5403. Fall even.