Code # Enter text…

**New Course Proposal Form**

**[ ] Undergraduate Curriculum Council**

**[X] Graduate Council**

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

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.

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| --- | --- |
| David F. Gilmore 9/29/2017 **Department Curriculum Committee Chair** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date…  **COPE Chair (if applicable)** |
| Thomas Risch 9/29/2017 **Department Chair:** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date…  **Head of Unit (If applicable)** |
| David F. Gilmore 9/27/2017 **College Curriculum Committee Chair** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date…  **Undergraduate Curriculum Council Chair** |
| Anne A. Grippo 9/29/2017 **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)

Travis Marsico; [tmarsico@astate.edu](mailto:tmarsico@astate.edu); 870-680-8191

2. Proposed Starting Term and Bulletin Year

Spring 2018; 2017 – 2018 Bulletin

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

BIO 5823

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

Natural History Collections Research Design

Short title: Nat Hist Coll Rsch Design

5. Brief course description (40 words or fewer) as it should appear in the bulletin.

Evaluation and development of research questions using current, peer-reviewed literature as a basis for discussion supported by natural history specimens and data. Research topics include taxonomy, biogeography, ecology, and global change biology. Activities demonstrate hypothesis testing in biodiversity science.

6. Prerequisites and major restrictions. (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. Are there any prerequisites? Yes
   1. If yes, which ones?

BIO 5813, Curation of Collections

* 1. Why or why not?

Students will be most successful in the completion of BIO 5823 if they have successfully completed the companion course BIO 5813, which teaches practical techniques of managing natural history collections.

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

7. Course frequency(e.g. Fall, Spring, Summer). *Not applicable to Graduate courses.*

8. Will this course 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 choose one.

Lecture

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

Standard letter

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

Yes

11. Is this course cross listed? (If it is, all course entries must be identical including course descriptions. It is important to check the course description of an existing course when adding a new cross listed course.)

No

1. If yes, please list the prefix and course number of cross listed course.

Enter text...

1. Are these courses offered for equivalent credit? Yes / No

Please explain. Enter text...

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

a. If yes, what program?

Enter text...

13. Does this course replace a course being deleted? No

a. If yes, what course?

Enter text...

14. Will this course be equivalent to a deleted course? No

a. If yes, which course?

Enter text...

15. Has it been confirmed that this course number is available for use? Yes

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

16. Does this course affect another program? No

If yes, provide contact information from the Dean, Department Head, and/or Program Director whose area this affects.

Enter text...

**Course Details**

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

DATE LECTURE TOPIC

WEEK 1 INTRODUCTION TO HISTORICAL USES OF NATURAL HISTORY COLLECTIONS

WEEK 2 THE PURPOSE OF GATHERING SPECIMENS IN THE 1600s-1800s (global discovery for science)

WEEK 3 NATURAL HISTORY COLLECTIONS RESEARCH IN THE 20th CENTURY (discovering extinctions)

WEEK 4 INTRODUCTION TO 21st CENTURY USES OF COLLECTIONS (including modern genetic techniques)

WEEK 5 DESCRIBING NEW SPECIES

WEEK 6 TAXONOMIC REVISIONS

WEEK 7 DOCUMENTING EXTINCTION

WEEK 8 COLLECTIONS IN GLOBAL CHANGE BIOLOGY RESEARCH

WEEK 9 COLLECTIONS IN BIOGEOGRAPHY

WEEK 10 SPRING BREAK

WEEK 11 COLLECTIONS IN BIODIVERSITY INVENTORY

WEEK 12 COLLECTIONS FOR RESTORATION PROJECTS

WEEK 13 OBTAINING DNA FROM SPECIMENS

WEEK 14 ANCIENT DNA

WEEK 15 PRESENTATION OF RESEARCH PROJECTS

18. Special features (e.g. labs, exhibits, site visitations, etc.)

Visits and hands-on activities in the Arkansas Center for Biodiversity Collections (ACBC).

19. Department staffing and classroom/lab resources

A regular classroom and resources associated with the Arkansas Center for Biodiversity Collections will be used.

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

No.

20. Does this course require course fees? No

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

**Course Justification**

21. Justification for course being included in program. Must include:

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

This course may be used to fulfill three hours in the graduate curriculum. This course will be particularly useful for students who plan on a life science career in academic or museum settings studying organismal biology, biogeography, ecology, and biodiversity. Also, field biologists of all types (and other types of science majors, too) will benefit from knowing about research using biodiversity collections because the ability to critically analyze research questions and develop testable hypotheses is a necessary skill for scientists. Goals for the course include understanding the variety of applications of natural history specimens in biological research and the limitations inherent in natural history specimen datasets. Through understanding how previous researchers have successfully used natural history collections in their research, students will develop skills to design their own research projects as university students and life science professionals.

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

For an MA or MS degree in Biology, one of the programmatic outcomes is to “Acquire the skills and knowledge needed for employment or advanced graduate study in discipline-related areas.” This course directly addresses this programmatic outcome by providing skills-based training for students that will prepare them for the natural history museum workforce, an important sector in the generation of new biological knowledge. Fundamental textbook knowledge in evolution, adaptation, diversity, structure, and function has been discovered using biological collections, and this course addresses the research that has been developed using these collections.

For students in EVS (MS or Ph.D.) program, this course will address two programmatic outcomes: 1) Advanced knowledge of the field: students will be able to demonstrate competency in the multi-disciplinary field through coursework and field/laboratory studies. This course will provide specific training in a branch of science important in the environmental sciences, biodiversity research. 2) Students will develop expertise in oral and written science communication skills. In this course, through discussion, preparing to lead, and leading discussions of peer-reviewed scientific literature, students will hone their development of science communication.

c. Student population served.

This course will primarily serve graduate students in biological sciences and environmental science. This course is designed to teach students how to effectively and appropriately interpret scientific literature to learn how researchers have used natural history specimen collections to answer important scientific research questions across space and time.

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

This course covers material that requires a high level of skill and specialization in biodiversity. Therefore, it is designated as a graduate level course. Individuals interested in curation or museum careers will greatly benefit from taking this course, and it covers material typically not covered in undergraduate biology curricula. This course differs from the undergraduate section of the course in the following ways: 1) graduate students will function as organizational team leaders for group projects in the course, 2) graduate students will be expected to present a lecture and/or lead a paper discussion of the relevant collections topic, and 3) graduate students will serve as peer-reviewers to undergraduates in the course as they develop their research projects.

**Assessment**

**University Outcomes**

22. Please indicate the university-level student learning outcomes for which this new course will contribute. Check all that apply.

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| * 1. **[X ]** Global Awareness | * 1. **[X ]** Thinking Critically | * 1. **[X ]** Information Literacy |

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

23. 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?

The program-level learning outcome for the course is: Students will be able to discuss the relevance of evolution to diversity. Because natural history collections are the way that scientists document Earth’s biological diversity outcomes, scientists who work in these collections are concerned with understanding the evolutionary processes that resulted in those outcomes. This course will reinforce this program-level outcome, and add to assessment reporting for this outcome.

24. 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.*

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| **Program-Level Outcome 1 (from question #23)** | Students will be able to discuss the relevance of evolution to diversity. |
| Assessment Measure | Students will participate in discussions of assigned reading material. Students will be assessed on the progress of their understanding through assessment of their contributions to the class discussions. Moreover, all graduate students in biology take a Biology Seminar capstone course, and they will be assessed in that course on this PLO |
| Assessment  Timetable | This program-level outcome will be assessed each time this course and the Biology Seminar course is taught. |
| Who is responsible for assessing and reporting on the results? | The instructor will assess the outcome and report the results to the Department Assessment Committee Chair. |

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

**Course-Level Outcomes**

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

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| **Outcome 1** | Compare and contrast research projects that utilize natural history specimen collections. |
| Which learning activities are responsible for this outcome? | Reading and lecture material and discussion of these. |
| Assessment Measure | Participation in weekly discussions based upon reading assignments and lecture materials. |
| **Outcome 2** | Develop a testable hypothesis using specimens and/or specimen data. |
| Which learning activities are responsible for this outcome? | Application of reading, lecture, and discussion materials, and hands-on experiences with natural history collections and their associated data. |
| Assessment Measure | Developing and implementing a research project; presenting results. |

**Bulletin Changes**

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| **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 5633. Environmental Toxicology: Mechanisms and Impacts** Understanding the basic principles behind the study of impacts and the mechanisms of physiological disturbances associated with environmental toxicant exposure to natural systems. Prerequisites: BIO 4131, BIO 4133 and CHEM 4232 or permission of professor. Lecture three hours per week.

**BIO 5684. Biological Data Analyses** Use of statistical tests and models (regression, ANOVA, generalized linear models, and mixed-effect models, PCA) to analyze ecological/biological data. Applications using a free statistical program. Prerequisite: Applied Statistics or equivalent.

**BIO 5704. Plant Systematics** A study of the systematics, nomenclature, morphology, and identification terminology for vascular plants with an emphasis on dichotomous key-based identification of flowering plants of Arkansas.

**BIO 5714. Dendrology** A study of the systematics, nomenclature, morphology, phenology, geographic range, and natural history of woody plants with an emphasis on field recognition throughout the year.

**BIO 5813. Curation of Collections** Current, appropriate museum-quality specimen curation for a range of taxa including the collection and preservation of specimens of vascular plants, fungi, mussels, fish, reptiles and amphibians, and mammals. Dual listed with BIO 4813. Prerequisites, BIO 1301, BIO 1303, BIO 1501 and BIO 1503 or equivalent courses.

***BIO 5823. Natural History Collections Research Design*** *Evaluation and development of research questions using current, peer-reviewed literature as a basis for discussion supported by natural history specimens and data.  Research topics include taxonomy, biogeography, ecology, and global change biology.  Activities demonstrate hypothesis testing in biodiversity science. Dual listed with BIO 4823. Prerequisite, BIO 5813 or approval from instructor.*

**BIO 6001. Biological Seminar** Required of all graduate students.

**BIO 6003. Scientific Methods and Research Design** A focus on the understanding and development of the scientific method as it pertains to research. Required of the graduate life sciences major, including students studying within the Biology, Botany, Wildlife Management and Zoology emphasis.

**BIO 6013. Evolutionary Biology** A summary of current theories concerned with evolution of biological organisms. An elective course particularly directed to the needs of biological science majors including students of Biology, Botany, Zoology, and Wildlife Management. (Fall of even years)

**BIO 6113. Advanced Cell Biology** Study of recent advances in cell biology through critical analysis of current literature. Focusing on eukaryotic cell structure and function, topics may include, but not be restricted to, cellular structures and organelles; cell cycling; signal transduction; gene regulation; and intracellular trafficking. Perquisites: A course in cell biology or permission of the professor.

**BIO 6123. Specialized Biochemistry** An advanced study of biochemical pathways leading to specialized biologically active metabolites. Emphasis will be on specialized pathways in plants and their counterparts in animals, and microorganisms.

**BIO 6143. Introduction to Biotechnology & Research Design** Study of molecular biological techniques and experimental designs through oral and written review of scientific literature. Career preparation by construction of curriculum vitae and work portfolios. Prerequisities: Students must be graduate students in a biological field of science.

**BIO 6196. Internship in Biotechnology** Participation in an internship with a private business, research center or public agency in the field of biotechnology. Included is a minimum of 300 work hours. Internship may be a volunteer or paid position. Included is the completion and approval of a synthesis paper covering methods and applications of molecular tools used during this internship. Prerequisite: BIO 6144, BIO 6154.

**BIO 6301. Aquatic Biology** The collection, identification, and study of aquatic invertebrate and vertebrate animals with emphasis on life history, ecology, and importance to man. Lecture one hour per week. Prerequisites: BIO 1503, 1501,1303,1301.

**BIO 6302. Laboratory for Aquatic Biology** Four hours per week. To be taken concurrently with BIO 6301. (Course fee, $20)

**BIO 6311. Laboratory for Medical and Veterinary Entomology** Two hours per week. To be taken concurrently with BIO 6313. (Course fee, $20)

**BIO 6313. Medical and Veterinary Entomology** A study of the taxonomy, biology and control of arthropods associated with human and animal diseases. Lecture three hours per week. Corequisite: BIO 6311.