

BIO 105: The Singing Life of Birds, Fall 2017

Lecture: Tuesday / Thursday 9-10:15pm; OLB 162

Professor: Megan D. Gall

Contact Information: Olmsted A52; megall@vassar.edu*; phone: x7115

Office hours: Wednesday 10:00-noon (an appointment helps here!)

Course Materials

Texts: 1. *Campbell's Biology, 11th Edition*

2. *The Singing Life of Birds: The Art and Science of Listening to Bird Song* by Donald Kroodsma (chapters will be posted on Moodle).

Other:

1. *Merlin Bird ID App:* <http://merlin.allaboutbirds.org/>

2. *Raven Lite:* <http://www.birds.cornell.edu/brp/RavenLite/RavenLiteDownload.html>

Course Description:

Many of us have awoken on a beautiful spring morning to the sound of birds singing. Indeed, bird song has enchanted and intrigued humans for millennia. To truly understand bird song we must understand both the hows (mechanisms and ontogeny) and the whys (function and phylogeny) of singing. We can also approach these questions from a dynamic (how did we get here: ontogeny and phylogeny) or static (what is the current state: mechanisms and function) view. For instance, we might wonder how the brains and muscles of birds work together to produce song or how singing behavior is affected by hormones (mechanisms). We might also wonder if bird song is innate or if baby birds have to learn how to sing (ontogeny). From an evolutionary perspective we might wonder why natural selection has favored singing (function) and how singing behavior is distributed among different bird species (phylogeny). In our quest to understand bird song we'll cover topics in genetics, cell biology, physiology, neuroscience, animal behavior, ecology and evolution.

Course Goals:

1. Understand and be able to explain basic biological themes and concepts.
2. Become familiar with presenting biological content in written and oral formats.
3. Become familiar with how to find, read, and analyze primary literature in biology.
4. Develop graphical and data interpretation skills in a biology context.
5. Develop deductive (general to specific) and inductive (specific to general) reasoning skills.
6. Become familiar with how "textbook" knowledge was obtained through the scientific process.

Point Breakdown by Assignments

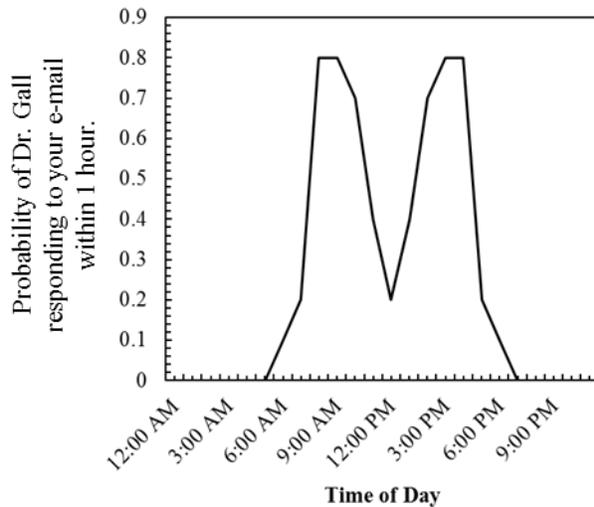
1. Exams (10 points each)	30
2. Final Exam	15
3. In-class Quizzes / Participation	10
4. Birds of Dutchess County Presentation	12
5. Letters Home	9
6. The Singing Life of Birds Assignments (SLB)	24
Total	100

BIO 105: The Singing Life of Birds, Fall 2017

TENATIVE SCHEDULE (note: any changes to the class schedule will be available via Moodle)

Week (Date)	LECTURE	Assignments	Reading
Week 1 Aug. 29, 31	8/29: Introduction: what is bird song? 8/31: How do we study bird song? What are Tinbergen's four questions?	*Bring smartphone w/ Merlin to class	Review Chapters 2-4
Week 2 Sept. 5, 7	9/5: How do we analyze birdsong? 9/7: How do birds learn song? (Ontogeny)	9/5: Laptop w/ Raven 9/8: SLB #1 Due (by 5)	SLB Ch. 1, 402-411 Chapter 51
Week 3 Sept. 12, 14	9/12: How do we study learning? (Article Discussion) 9/14: Test 1 (Ontogeny and Scientific Method)	9/14: Letter Home #1	JA#1 SLB 313-320
Week 4 Sept. 19, 21	9/19: How is song produced? (Physiological mechanisms and anatomical substrates) 9/21: What cells are in song producing structures? How does song affect the brain? (Cell Division)		Skim Chapters 42, 48-50 Chapters 6, 7, and 12
Week 5 Sept. 26, 28	9/26: Why are songs of relatives similar? (Inheritance) 9/28: How are genes are involved in song production? (DNA replication, Transcription and Translation!)		Chapter 13-15 Chapters 17
Week 6 Oct. 3, 5	10/3: How does song affect physiology? (Cell Communication and Long Distance Signals) 10/5: How do animals produce energy for singing? (Metabolism)	10/5: SLB #2 Due	Chapter 11 Chapter 8-10
Weeks 7 Oct. 10, 12	No Class (Spring Break)		
Week 8 Oct. 17, 19	10/17: Test 2 (Mechanisms) 10/19: Why has song diversity arisen? (Darwin and Evolution by Natural Selection)	10/17: Letter Home #2	Chapter 22
Week 9 Oct. 24, 26	10/24: How are genes related to evolution (I)? 10/26 How are genes related to evolution (II)?		Chapter 21 and 23 See also Moodle
Week 10 Oct.31, Nov. 2	10/31: Why do birds sing? (Adaptation, Sexual Selection) 11/2: How do behaviors evolve? (Social behavior and kin selection)	11/2: First draft of blog posts due	Chapter 51
Week 11 Nov. 7, 9	11/7: Why else might birds sing? (Article Discussion) 11/9: What is the relationship between song and speciation?	11/9 SLB #3 Due	JA #2 Chapter 24 SLB Ch. 3
Week 12 Nov.14, 16	11/14: How is bird song distributed among species? (Phylogeny and Taxonomy) 11/16: How can phylogeny be used to test hypotheses? (The comparative method)	11/16: Letter Home #3	SLB Ch. 6 Chapter 26
Week 13 Nov. 21	11/21: Test 3 (Function and Evolution) 11/23: Thanksgiving!		
Week 14. Nov. 28, 30	11/28: Birds of Dutchess County Presentations 11/30: Birds of Dutchess County Presentations	11/30: Final Blog Post Due	
Week 15 Dec. 5	12/5: Return to Tinbergen's Four Questions FINAL DAY FOR REVISED ASSIGNMENTS	12/5: SLB #4 Due JA #3 in class	JA #3

BIO 105: The Singing Life of Birds, Fall 2017



E-mail Policy (Monday through Friday): Before sending an e-mail, please make sure your question cannot be answered by the syllabus (e.g. where is my office, when are my office hours, etc.). Please address your e-mails to Dr. Gall or Professor Gall (good advice for contacting any professor for the first time). I expect your e-mails to be professional, with correct grammar and punctuation. Be sure to sign your e-mails.

Assignment Expectations, Experience Points and Grading:

In this class we will use a combination of traditional and experience point grading systems. What does this mean for you? For (1) Letters Home (2) The Singing Life of Birds and (3) Birds of Dutchess County Blog Posts you will turn in the assignment on the due date listed on the syllabus. I will either accept the assignment (the assignment is 100% correct and you will receive full points) or return the assignment with instructions to revise. If you receive instructions to revise, you ***must*** revise the assignment to receive points. You will have one opportunity to revise your assignment. In your revision you should explain how and why you modified your answers. The due date for the revisions can be found on Moodle. For lecture exams, you will also have one opportunity to revise; however, you may only increase your grade by 10%. All other assignments are due on the date indicated and will be graded in the standard fashion.

Assignments are due before the class starts on the day indicated on the schedule. Assignments **must be stapled** when turned in (no paper clips, no folding the edges of the paper). Revisions should be on a new sheet of paper and stapled to your original assignment. Points will be deducted for assignments that are not correctly formatted.

Letters Home:

During the course of the semester you will write three letters: one for each of the first three sections of the class. They must be turned in prior to the test. The idea of these letters is to summarize what you have learned about a topic in class [for instance you might write a letter on our class “How do animals produce energy for singing? (Metabolism)”]. You should write a letter to someone in your life that is NOT a scientist, but is a smart person! How would you go about explaining this topic to that person? You should explain the concepts in simple straightforward language, while still covering all the important details. It is extremely important for scientists to be able to communicate their ideas to people that are not scientists (e.g. congress, new outlets, etc.).

The Singing Life of Birds Assignments (SLB):

The singing life of bird assignments will integrate different parts of the class and will require that you (1) deeply engage with Donald Kroodsma’s book “The Singing Life

BIO 105: The Singing Life of Birds, Fall 2017

of Birds” (2) learn to find, cite, read, analyze and summarize primary literature papers in biology (3) gain a thorough understanding of subjects we cover in class and (4) develop the ability to think critically, synthesize information, and apply the scientific method. These assignments are posted on the Moodle page for the class.

Lecture Exams:

The three lecture exams will cover notes given in class and pertinent information from the textbook and other reading. Some notes will come from sources other than the text. The first three exams will cover material from the classes prior to the exam period. The final exam will be a cumulative exam covering all the material from the course. Each exam will consist of two parts: a largely information based section that will be completed independently and a synthetic / critical thinking section that will be completed as a group. Class exams can be revised once.

In-class Assignments / Participation:

There will be several in-class assignments throughout the semester. You will need to be in class to complete these assignments for their points. Additional participation points will be awarded based on attendance and participation in small group and class discussion.

Birds of Dutchess County Presentations and Blog Posts:

Throughout the semester we will become familiar with 10-12 birds (depending on our final class size!) that are found in Dutchess County. You should choose your species of interest and sign-up early in the semester (sign-up sheet found on Moodle). In both your presentation and posts you should cite any information that is not common knowledge, as detailed in the “how to cite literature” handout that is posted on Moodle.

Presentation Pairs of students will be required to present information about one species to the class in a 10 minute presentation (with two minutes for questions). Your presentation should include both a general report on their biology (their social system, breeding behavior, habitat of choice, foraging behavior, and any observations that you have made of the birds on Vassar’s Campus or in Dutchess County) and should describe any research on the singing behavior of these birds (e.g. what does their song sound / look like, do they have a dialect, do they learn their song or is it innate, etc.). Finally, you should propose where future research on this species should focus and what kind of experiments you would use to address this question.

Blog posts: For the species that each pair chooses they should prepare **TWO** blog posts (<http://pages.vassar.edu/sensoryecology/the-birds-of-dutchess-county/>) that will be posted on the Gall Lab blog. You will receive instructions during the semester on how to use wordpress. **The first post** should be a general report on their biology: their social system, the breeding behavior, their habitat of choice, their foraging behavior, and any observations that you have made of the birds on Vassar’s Campus or in Dutchess County. The first post should contain pictures, maps, or any other media that will help people understand their biology. An excellent resource to start looking

BIO 105: The Singing Life of Birds, Fall 2017

for information is the Birds of North America website, run by Cornell lab of Ornithology: <http://bna.birds.cornell.edu/bna>. ***The second post*** should focus on the singing behavior of the birds. This post should describe any research on the singing behavior of these birds (e.g. what does their song sound / look like, do they have a dialect, do they learn their song or is it innate, etc.). **For the second blog post you will need to cite primary literature (at least 5 sources), including at least two papers from the last 3 years.** An excellent place to start looking for articles is www.isiknowledge.com. In each post you should also propose where future research on this species should focus and what kind of experiments you would use to address this question. As always, I'm available to help you work through this assignment.

Make up policy:

The makeup exam will be administered at the end of the semester. You will only be allowed to make up one exam; you will receive a zero for each exam beyond that.

Late Policy:

You have a total of 2 grace days to use during the semester (write "grace day" on top of a late assignment) that allow an assignment to be turned in without penalty within 24 hours of the due date. Grace days may not be used to extend the final revision deadline (the last day of class) or for the presentations at the end of the semester. Late assignments will lose 10% of the assignment value for each day (24-hours) that the assignment is late.

Accommodations:

Academic accommodations are available for students registered with the Office for Accessibility and Educational Opportunity. Students in need of ADA/504 accommodations should schedule an appointment with me early in the semester to discuss any accommodations for this course that have been approved by the Office for Accessibility and Educational Opportunity, as indicated in your AEO accommodation letter.

Originality and Attribution: You are responsible for following the procedures detailed in the handbook, Originality and Attribution: A Guide for Student Writers at Vassar College. If you have any questions about attribution, you must see me well before an assignment is due.

BIO 105: The Singing Life of Birds, Fall 2017

Grades:

% Points	Final Grade
94-100:	A
90-93.99:	A-
87-89.99	B+
83-86.99	B
80-82.99	B-
77-79.99	C+
72-76.99	C
70-71.99	C-
67-69.99	D+
60-66.99	D
0-59.99	F

From the Vassar Catalogue

A indicates achievement of distinction. It involves conspicuous excellence in several aspects of the work.

B indicates general achievement of a high order. It also involves excellence in some aspects of the work, such as the following:

- Completeness and accuracy of knowledge
- Sustained and effective use of knowledge
- Independence of work
- Originality

C indicates the acceptable standard for graduation from Vassar College. It involves in each course such work as may fairly be expected of any Vassar student of normal ability who gives to the course a reasonable amount of time, effort, and attention. Such acceptable attainment should include the following factors:

- Familiarity with the content of the course
- Familiarity with the methods of study of the course
- Evidence of growth in actual use both of content and method
- Full participation in the work of the class
- Evidence of an open, active, and discriminating mind
- Ability to express oneself in intelligible English

C-, **D+**, and **D** indicate degrees of unsatisfactory work, below standard grade. They signify work which in one or more important respects falls below the minimum acceptable standard for graduation, but which is of sufficient quality and quantity to be counted in the units required for graduation. Work evaluated as **F** may not be counted towards the degree.