***BIO-296 Animal Communication***

***Spring 2018***

Course Instructor Laura J May-Collado, Ph.D.

102 Marsh Life Science Bldg

Office Hours: by appointment

E-mail: lmaycoll@uvm.edu

COURSE DESCRIPTION

This course is a Biology elective course for students interested in animal behavior, behavioral ecology, physiology, psychology, and cognitive sciences that provide an integrative approach to the study of animal communication. We will explore different designs and modes of communication, but focus primarily on unique adaptations for acoustic communication in a variety of environments.

The course will begin by introducing students to the different modes and mechanisms of animal communication. After this introduction we will focus on the use of sound to communicate, beginning with an introduction to basic concepts about the physics of sound and how animals have evolved behaviors and anatomical features that enhance signal transmission and reception in changing environments. We will explore the major evolutionary and ecological factors that have shape signal emission and processing by exploring the diversity of acoustic communication strategies in different animals, from the tiny water boatman insect to the large blue whale.

Through presentations and discussion of current scientific research students will learn about the basic mechanisms of signal emission and reception, how animals optimize information transfer, and about the reliability and deception in acoustic signal systems. In the lab students will obtain basic skills on acoustic monitoring and acoustic analysis and develop their own research project.

The learning goals of this course are:

* Understand the basic concepts of the physics of sound: sound wave anatomy, types of sound waves, propagation media, Doppler effect, and transmission loss.
* Learn about the morphological and physiological adaptations for sound emission and reception across animal groups.
* Apply evolutionary principles to understand the wide diversity of animal acoustic communication strategies.
* Appreciate the importance of acoustic communication to understand other aspect of animal biology.
* Get students familiar with the various field and analysis methods to study animal acoustic communication.
* Be able to critically analyze literature of 'hot topics' by synthesizing literature and forming own opinions for class discussion.

Lectures:

MWF from 1:10 to 2:00 p.m. please be on time; turn off your cell phone, do not leave your seat during a presentation. PowerPoint slides will be available on BB by the end of the week. I strongly urge you to come to class and take notes, especially given that we do not have a textbook! Also, I recommend taking notes on a notebook rather than your laptop or ipad.

Textbooks: The first part of the course will consist of lectures that are based on a combination of resources: books, recent scientific papers, and more. You are not required to buy a new book for this first part. However, I recommend looking for these books in the library to complement lecture material. I will try to put them on reserve at the library.

* Principles of Animal Communication. 2nd Edition. J.W. Bradbury and S. L. Vehrencamp. Sinauer Press.
* Animal Signals. J. Maynards Smith and D. Harper. Oxford Series in Ecology and Evolution.

The rest of the course is base on presentations and discussions of current scientific work on a variety of topics with a primary focus on the use of sound for communication. See course calendar.

Other Important online resources  How to seriously read a scientific paper http://www.sciencemag.org/careers/2016/03/how-seriously-read-scientific-paper

* Principles of Animal Communication. 2nd Edition Resources http://sites.sinauer.com/animalcommunication2e
* Acoustic and Vibration Animations: http://www.acs.psu.edu/drussell/demos.html
* Discovery of Sound in the Sea https://dosits.org/
* ARBIMON II: https://arbimon.sieve-analytics.com
* McCaulay Sound Library: https://www.macaulaylibrary.org/
* William A. Watkins Collection of Marine Mammal Sound Recordings https://darchive.mblwhoilibrary.org/handle/1912/5877
* Right Whale Listening Network http://www.listenforwhales.org/Page.aspx?pid=430
* Sea of Sound http://www.birds.cornell.edu/Page.aspx?pid=2207#

GRADING: Your grade will be based on your total points at the end of the semester. We will follow the traditional grading scale: A = 90-100%, B = 80-89%, C = 70-79%, D = 60-69%, F = < 60%. Plus and minus grades will reflect scores close to these borders. There will be three midterm exams and a cumulative final exam in this course. The point breakdown is as follows:

|  |  |
| --- | --- |
| LECTURE | |
| 3 Exams | 250 (each 100 pts., lowest exam will count  50%)) |
| 2 Paper Presentations & Lead Discussions | 200 (each 100 pts.) |
| Poster Presentation | 200 |
| Attendance and Participation in class | 50 |
| Total | 700 |

Exams: All material covered in class including PPT lectures, videos, assigned literature, weekly questions, and any other resource highlighted in class will be part of the exam. Do not make travel arrangements to leave campus before the date of the final exam! Barring extraordinary circumstances, THERE WILL BE NO MAKE-UP EXAMS and exams will not be rescheduled to accommodate travel plans during the semester. The only legitimate excuse for rescheduling an exam is if you have three exams on one day, you have a documented medical condition or other emergency, or you must be off-campus for a university sponsored event or religious holiday. In such cases you will contact me before the date of the exam to discuss the situation and if granted to discuss the date and time the make-up exam. Discuss such exam conflicts with me as soon as possible! There is no cumulative final exam in this class. Exam dates are as follow:

Exam I February 16: Multiple-choice plus short answer questions.

Exam II March 23: 5 essay questions.

Exam III April 30: Take Home.

Blackboard: We will use the Blackboard site to post announcements, lecture slides, and all the resources covered in class. I rely on this online resource to communicate with all students, so make sure you regularly check BB.

Scientific Paper Presentation and Lead Discussion: Every student in this class has been assigned two papers (find your papers on the calendar). This dynamic approach to learning requires that EVERY STUDENT comes prepared to class, meaning everyone must read the paper before class. The students presenting and leading discussion on a given day, must present a summary before discussion. To prepare for this part of the assignment, I recommend you to read the following resource on How to seriously read a scientific paper

http://www.sciencemag.org/careers/2016/03/how-seriously-read-scientific-paper

Students can present the summary of the paper using a PPT or any other way they think is fit. However, keep in mind that most of the time should be dedicated to discussion. Bring copies of the summary for everyone in class. Here you will find excellent advice on how to successfully lead a discussion of a scientific paper:

https://arthropodecology.com/2015/01/21/leading-a-discussion-of-a-scientific-paper/

To access your assigned paper go to: http://library.uvm.edu/research/ click on Research Databases, click on W, select Web of Science, and search for your paper by title or author.

Poster Presentation: The scientific review is your opportunity to dive into a topic of your interest within animal communication. The goal of this activity is that you review scientific papers related to one topic (minimum 5 papers). What is a scientific review? A scientific review attempts to summarize the current state of knowledge on a topic. It is not just a simple description of ‘he said, she said’ it is an integrated and analytical summary of a topic. For example, you may discuss evidence in favor and against a hypothesis on the evolution of signal honesty. This assignment is 200 points so make sure you take the time to do this. Before you this endeavor I strongly recommend that you discuss the topic with me.

What am I expecting? That you present a clear question and present evidence (supporting or against it the hypothesis) by summarizing the papers and present them in a poster format in class to share with your peers. Posters typically include a title, authors, background, methods, 1-3 results, conclusions and acknowledgements. Here are the guidelines based on the last conference my students attended. My rubric to grade the poster is largely based on these guidelines:

http://www.smmconference.org/GuidanceforPosterPresenters

* The maximum length or width of the poster should not exceed 45” (114 cm).
* Remember that a poster presentation provides the ideal opportunity to meet and talk with your peers. It offers a more intimate forum for information exchange than does a spoken presentation.
* Good posters are essentially extended abstracts with easily readable graphics to make the main points. The poster should clearly describe the research and its results without need for extended explanation.
* TITLE: The title of your poster and the names of the authors should be large and clearly visible from 20 feet away. This means that the font should be at least 1 inch (2.54 cm, 72point font size) in height. Affiliations and contact details (including e-mail addresses) of authors should be included.
* ABSTRACT: The full text of your abstract may be included, or an abbreviated version. Some presenters find a pictoral abstract to be effective.
* TEXT: Any text should be kept to a bare minimum, keeping in mind that the main points of your poster should be contained in the figures and illustrations and their captions. The text should be in at least 18-point font size to be easily read.
* GRAPHICS: Graphics, such as tables, figures, and illustrations, should contain the majority of the content of your poster. They should be clear and concise and should convey their primary meaning with little effort from the viewer. All graphics should include a brief heading or caption describing their content and meaning, and expressing the primary point of the graphic. A brief figure legend should be included below the main caption in smaller type, containing a more-detailed description of the points of the graphic. The legend should include a description of the graphic as well as the conclusions derived from its content.
* LAYOUT AND DESIGN: Posters can be produced by using design or presentation software such as Microsoft PowerPoint. The entire poster can be laid out as a single file, including text, tables, figures, and photographs. Modifications to the design can be accomplished easily until the desired layout is achieved. The poster can then be printed here at the department (I will get back to you on this).
* BRING ‘mini’ versions of your poster as handouts for your peers to take with them for further study.

LECTURE CALENDAR SPRING 2018

This calendar is subject to change as seem fit by the instructor

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| --- | --- | --- | --- |
| Dat  e | Day | Lecture | Topic |
| 17-  Jan | W | Introduction: Why study animal communication? Cues, signals, and signal evolution | Basics |
| 19-  Jan | F | Basics of Sound | Basics |
| 22-  Jan | M | Basics of Sound | Basics |
| 24-  Jan | W | Sound Movement | Basics |
| 26-  Jan | F | Sound Movement | Basics |
| 29-  Jan | M | How animals use sound? Acoustic communication in terrestrial and aquatic vertebrates. Ladich and Winkler. 2017. Journal of Experimental Biology. 220:2306-2317. (ME) | Diversity of Sounds |
| 31-  Jan | W | Body size and sound: Reexamining the relationship between body size and tonal signal frequency in whales: a phylogenetic comparative approach. May-Collado et al. 2007. Marine Mammal Science. 23: 524552. (ME) | Diversity of Sounds |
| 2-Feb | F | Sound Production and Reception: Invertebrates | Diversity of Sounds |
| 5-Feb | M | Sound Production and Reception: Fish | Diversity of Sounds |
| 7-Feb | W | Sound Production and Reception: Amphibians | Diversity of Sounds |
| 9-Feb | F | Sound Production and Reception: Amphibians | Diversity of Sounds |
| 12-  Feb | M | Sound Production and Reception: Birds | Diversity of Sounds |
| 14-  Feb | W | Sound Production and Reception: Birds | Diversity of Sounds |
| 16-  Feb | F | Exam 1 (up to Fish communication) |  |

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| 19-  Feb | M | **President's Day Holiday** |  |
| 21-  Feb | W | * Dangerous mating systems: Signal complexity, signal content and neural capacity in spiders. Herberstein et al. 2014. Neuroscience   and Behavioral Reviews 46:509-518. (AYANNA  CASTANEDA)   * Reproductive success in the Lusitanian toadfish: influence of calling activity, male quality and experimental design. Amorim, et al. 2016. Physiology and Behavior. 155: 17-24. (JOHN BASA) | Sexual Selection & Courtship |
| 23-  Feb | F | * The multiple functions of male song within the humpback whale (Megaptera novaeangliae) mating system: review, evaluation,   and synthesis. Herman. 2017. Biological Reviews. 92: 1795-  1818. (EMMA CHERESKI)   * Changes in vocal parameters with social context in humpback whales: considering the effet of bystanders. Dunlop. 2016.   Behavioral Ecology and Sociobiology. 70: 857-870. (CHRIS  DAMON) | Sexual Selection & Courtship |
| 26-  Feb | M | * Acoustic communication within ant societies and its mimicry by mutualistic and socially parasitic myrmecophiles. Schonrogge et a. 2017. Animal Behavior. 134:249-256. (COREY PETTERGILL). * Hawkmoths produce anti-bat ultrasound. Barber and Kawahara. 2013. Biology Letters. 9:20130161. (HESTER HALL) | Acoustic mimicry |
| 28-  Feb | W | * Eavesdropping and cue denial in avian acoustic signals. Searcy and Yasukawa. 2017. Animal Behaviour. 124:273-282.   (PATRICK MULLINS)   * Cryptic termites avoid predatory ants by eavesdropping on vibrational cues from their footsteps. Oberst et al. 2017. Ecology   Letters. 20: 212-221(TAYLOR PALMER) | Eavesdropping |
| 2-Mar | F | * Maternal signature whistles use aids mother-calf reunions in a bottlenose dolphin, Tursiops truncatus. King et al. 2016.   Behavioral Processes. 126: 64-70. (BECKY DAW).   * Mother vocal recognition in Antarctic Fur Seal Arctocephalus gazelle pups: a two-step process. Aubin et al. 2015. PLOS ONE.   10: e0134513 (ARDEN PORTER). | Mother-calf recognition |
| 5-Mar | M | * What's in a voice? Dolphins do not use voice cues for individual recognition? Sayigh et al. 2017. Animal Cognition. 20:10671079. (RYAN PRATT). * Vocal individuality and species divergence in the contact calls of banded penguins. Favaro et al. 2016. Behavioural Process. 128:   83-88. (HEATHER SHUETTER) | Group and individual |
| 7-Mar | W | * The structure of stereotyped calls reflects kinship and social affiliation in resident killer whales. Deecke et al. 2010.   Naturwissenschaften. 97: 513-518. (SHANNON RITTER).   * Using playback of territorial calls to investigate mechanisms of kin discrimination in red squirrels. Shonfield et al. 2017.   Behavioral Ecology. 28:382-390. (MICHELE SANDLER). | Signal can reflect relatedness |
| 9-Mar | F | * Plasticity of signaling and mate choice in a trilling species of Mecopoda complex (Orthoptera: Tettigonidae). Krobath and Hartbauer. 2017. Behavioral Ecology and Sociobiology. 71: UNSP164. (HEATHER WILLIAMS) * Close-range vocal signals elicit a stress response in male green treefrogs: resolution of an androgen-based conflict. Leary. 2014. Animal Behaviour. 96:39-48. (ELIZABETH WHALEN). | Cost of signaling |
| 12-16  Mar | M-F | **SPRING BREAK** |  |
| 19-  Mar | M | Mammalian Acoustic Communication |  |

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| 21-  Mar | W | Mammalian Acoustic Communication continuation |  |
| 23-  Mar | F | Exam 2 (5 essay questions with multiple parts). Take Home. |  |
| 26-  Mar | M | * Coping with a changing soundscape: avoidance, adjustments, and adaptations. Potvin. 2016. Animal Cognition. 20:9-18. (ME). * Unanticipated consequences of ocean acidification: a noisier ocean at lower pH. Hester et al. 2008. Geophysical Research Letters. 35(19). (ME). * Noiseonomics: The relationship between ambient noise levels in the sea and global economic trends. Frisk. 2012. Scientific Reports. 2:437. (ME). | Noise and communication |
| 28-  Mar | W | * Evidence that ship noise increases stress in right whales. Rolland et al. 2012. Proceedings of the Royal Society B-Biological Sciences. 279: 2363-2368. (AYANNA CASTANEDA) * Song of the city: noise-dependent spectral plasticity in the acoustic phenotype of urban birds. Slabbekoorn. 2013. Animal   Behaviour. 85:1089-1099. (JOHN BASA) | The effect of  Noise on animals |
| 30-  Mar | F | * Effects of traffic noise on tree frog stress levels, immunity, and color signaling. Troianowski et al. 2017. Conservation Biology.   31:1132-1140. (EMMA CHERESKI)   * Lost at sea: ocean acidification undermines larval fish orientation via altered hearing and marine soundscape information. Rossi et al. 2015. Biology Letters 12: 20150937. (CHRIS DAMON) | The effect of  Noise on animals |
| 2-Apr | M | * Spatial patterns in reef-generated noise relate to habitats and communities: Evidence from a Panamanian case study. Kennedy   et al. 2010. Journal of Experimental Marine Biology and Ecology. 395: 85-92. (COREY PETTERGILL).   * School is out on noisy reefs: the effect of boat noise on predator learning and survival of juvenile coral reef fishes. Proc. R. Soc. B 285: 20180033.   http://dx.doi.org/10.1098/rspb.2018.0033 (HESTER HALL). | Natural noise as a cue for good habitat |
| 4-Apr | W | * Acoustic monitoring for conservation in tropical forests:   examples from forest elephants. Wrege et al. 2017. Methods in Ecology and Evolution. 8:1292-1301. (PATRICK MULLINS)   * Species richness of insects drives the use of acoustic space in the tropics. Aide, et al. 2017. Remote Sensing. 9:11. (TAYLOR   PALMER) | Soundscape Ecology |
| 6-Apr | F | * Measuring sound detection spaces for acoustic animal sampling and monitoring. Darras et al. 2016. Biological Conservation. 201:   29-37 (HEATHER WILLIAMS)   * Acoustic indices provide information on the status of coral reefs:   an example from Moorea Island in the South Pacific. Bertucci et al. 2016. Scientific Reports. 6:33326. (BECKY DAW). | Soundscape Ecology |
| 9-Apr | M | Light and Visual Signal Production | Other modes of communication |
| 11-  Apr | W | * Flash signal evolution in Photinus fireflies: character displacement and signal exploitation in a visual communication system. Stanger-Hall et al. 2015. Evolution. 69: 666-682. (RYAN PRATT). * Cuttlefish perform multiple agonistic displays to communicate a hierarchy of threats. Schnell et al. 2016. Behavioral Ecology and Sociobiology. 70: 1643-1655. (ARDEN PORTER). | Other modes of communication |
| 13-  Apr | F | Chemical Signals | Other modes of communication |
|  |  |  |  |
| 16-  Apr | M | * To pee or not to pee: urine signals mediate aggressive interactions in the cooperatively breeding cichlid   Neolamprologus pulcher. Bayani et al. 2017. Behavioral Ecology and Sociobiology. 71: UNSP37. (HEATHER SHUETTNER).   * Sternal gland scent-marking signals sex, age, rank, and group identity in captive mandrills. Vaglio et al. Chemical Senses 2016 41:177-186 (ELIZABETH WHALEN). | Other modes of communication |
| 18-  Apr | W | Short Range Modalities | Other modes of communication |
| 20-  Apr | F | * Rapid jumps and bioluminescence elicited by controlled hydrodynamic stimuli in a mesopelagic copepod, Pleuromamma xiphias. Hartline et al. 1999. Biological Bulletin. 197: 132-143.   (SHANNON RITTER). Hydrodynamic receptions   * Social interactions between live and artificial weakly electric fish: electrocommunication and locomotor behavior of Mormyrus rume proboscirostris towards a mobile dummy. Worm et al.   2017. PloS ONE. 9:e0184622. (MICHELE SANDLER). | Other modes of communication |
| 23-  Apr | M | Microbial communication: mate choice, cooperation and conflict. | Communication in micros |
| 25-  Apr | W | Plant communication: sexual selection, defensive alarm signals, and attraction of animal mutualists. | Communication in plants |
| 27-  Apr | F | Human communication |  |
| 30-  Apr | M | **Take Home Exam 3 Instructions (Due on May 4th) and course Review** |  |
| 2-  May | W | **Poster Presentations on topic of your choice. Optional.** |  |

The Lab

There are two lab sections for this course T, R from 1:00 to 4:00 p.m. The schedule below highlights the lab days and assignments for each. During lab sessions you will be learning the basics of acoustic signal analysis and collecting data for your own research project.

Software:

For the lab you will need to purchase access for RAVEN at www.birds.cornell.edu/brp/raven/RavenOverview.htlm from The Cornell Lab of Ornithology. Students have a 75% discount. Do not get the free Raven Lite as you will not be able to use a number of features that are important for this course.

Lab exercises: will be posted in BB every week. You are expected to bring a printed copy to the lab.

GRADING

|  |  |
| --- | --- |
| L | AB |
| 4-Lab Reports: | 200 (50 pts. each) |
| Research Project   * Research Project Proposal * Research Project manuscript Draft * Reviewer Assignment * Final Project manuscript * Oral Presentation | 500 (100 pts. each part) |
| Total | 700 |

Lab Reports: You only need to submit four of the five following reports. See description of reports on Blackboard for preparation of lab reports. Reports are due on the day of your lab as indicated below.

Raven I- Week 3; Raven II- Week 5; Arbimon- Week 6; Marine Mammals-Week 7; Frogs and Birds- Week 10

Research Project: Throughout this course you will develop your own acoustic research project using the resources provided to you. Projects are individual not in groups or pairs. We will use the following journals format Journal of the Acoustical Society of America (JASA). The rubric to grade your paper will be based on the Author Guidelines for JASA, which you can find here.

Examples are provided in BB.

http://asa.scitation.org/pb-assets/files/publications/jas/jasinfcon.pdf

The Research Project consist of three parts: the first is the project proposal (3-5 pages) that describes the scientific context of the study, the species and type of signals to be examined, the scientific question of interest, and how the data will be collected and analyzed. For more details see below. The second part is the preparation of the written manuscript, first a draft and then the final manuscript, following the instructions described below. The third part is the oral presentation of your work, see specifications below.

Proposal (3-5 pages) due on the week of February 6-8: Prior writing your proposal, you are strongly encouraged to discuss your ideas with your Instructor, to determine the feasibility of the project and available material. The proposal must consist of the following parts. An example is provided in BB.

* Introduction – Background to problem with citations of papers or other sources that document the information you are presenting. This background should include the observations that lead to your question or hypothesis. Purpose and scope - Statement of the purpose of your paper, this may be how you are testing your hypothesis. If you use hypothesis you need to make predictions about the hypothesis. Significance: How does your project advance knowledge on this field? How does your project benefits society?
* Materials and Methods - What type of data have you found and what additional data are you going to try to find? How will the data you collect be analyzed to address your objectives, questions or hypothesis? It is important to make it clear how the scientific method will be used to test or address either your hypothesis or the predictions you expect if the hypothesis is true.
* Expected outcomes
* Research Plan - Schedule of steps to be accomplished with deadline dates.
* Literature Cited – Should include a minimum of 10 references. Full reference to the papers cited in the introduction and materials and methods sections. Use format from Journal of the Acoustical Society of America
* You will turn in an electronic copy on the week of 6-8 Feb. The submission is a doc file NOT pdf! Note: I recommend doing a serious literature review of your topic! A lot of what you write her will serve as the backbone for your research paper.

Data collection and analysis: In the lab we will review the data and resources that are available to you the first week of classes so that you can start data collection right away.

Research Paper Draft due on the week of March 27-29: I expect a complete manuscript in format with JASA. In the lab we will have a workshop on how to write a scientific paper. See example of draft in BB.

Reviewer Assignment due on the week April of 3-5: Each of you will receive one manuscript to review. Your confidential critical reviews are expected to provide constructive criticism of how the paper can be improved and point out weakness of the paper. The rubric to evaluate your review will follow the elements highlighted here: https://www.elsevier.com/reviewers/how-to-conduct-a-review of a paper for publication.

Along your review you will write a letter to the Editor with your recommendation

* Reject (explain reason in report): in our case the paper needs serious revisions (e.g., analyses are incomplete or not appropriate, hard to understand, hypothesis is not supported given the data etc.).
* Accept without revision: the paper is well written, analysis are adequate, follows format, etc.
* Revise – either major or minor (explain the revision that is required, and indicate to the editor whether or not you would be happy to review the revised article)
* Make sure the paper follows the format of JASA. You were given the guidelines above to check authors follow through.

Research Paper Final Submission due on the week of April 10-12: You are expected to submit a final electronic paper (doc NOT pdf!) accompanied with a letter to the editor addressing the comments and corrections from your reviewers. Your final electronic version should look EXACTLY in format with JASA. This is important, as a booklet will be put together for the course.

Oral presentations are on April 17-19: Please bring your presentations to your GTA 24-hours prior to your presentation. The format is PowerPoint (PPT or PPTX), standard definition, 4:3 ratio. The presentation computers will be running Powerpoint 2013. Please embed any videos or audio within the presentation. Also include ALL videos & audio files in a separate folder on your thumb drive. This will enable us to correct any problems on site.

* Traditional oral presentations. You will have 10 minutes, 8 minutes for your presentation, and 2 minutes for questions. If you decided on this format follow this guidelines
* Speed talks. A speed talk is a four-minute presentation during which you may present keyideas, results and their meaning/implication. Three slides should be sufficient. Questions will be asked during a 6-minute period at the end of the session. Please bring your presentations to your GTA 24-hours prior to your presentation.
* Video presentation: A video presentation is of the same length as a speed-talk (four minutes) but created using various media such as high-resolution video, animation and narration. Authors should use these various media in a creative manner to clearly express the purpose of the study, results and their implication and to be understood not only by scientific peers but also by a wider audience. Questions will be asked during a 6-minute period at the end of the session. Please bring your video to your GTA 24-hours prior to your presentation. Video guidelines and tips here: http://www.smmconference.org/videopresentationfaq Use available resources don’t go crazy!

LAB CALENDAR SPRING 2018

This calendar is subject to change as seem fit by the instructor

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| --- | --- | --- | --- |
| Week | Date | Lab | Assignments |
| 1 | 16-18 Jan | No Lab |  |
| 2 | 23-25 Jan | Introduction to the Lab and Resources available to you  Intro to RAVEN I  How to Write a Proposal and Scientific Paper |  |
| 3 | 30 Jan-1Feb | Intro to RAVEN II | RAVEN I Report Due |
| 4 | 6-8 Feb | ARBIMON I: Intro and Demonstration of Species Classification tools | Proposal Due |
| 5 | 13-15 Feb | ARBIMON II Demonstration of Soundscape Analysis Tools  Discussion of projects with Instructor (you are expected to briefly present your idea to the class for feedback collecting data) | Raven II Report Due |
| 6 | 20-22 Feb | Marine Mammal Signals | ARBIMON Report Due |
| 7 | 27Feb-1Mar | Bird and Frog Signals | Marine Mammal  Report Due |
| 8 | 6-8 Mar | No Lab-Town Meeting Day Recess  You are expected to meet with your instructor and provide an update on your data collection during this week. |  |
| 9 | 13-15 Mar | No Lab-Spring Break |  |
| 10 | 20-22 Mar | Data Analysis Workshop  You are expected to meet with your instructor and provide an update on your data collection. | Bird-Frog Report  Due |
| 11 | 27-29 Mar | How to review a manuscript | Research Paper  Draft Due |
| 12 | 3-5 Apr | How to respond to the editor and reviewers | Review of Paper Due |
| 13 | 10-12 Apr | Meeting Time/Preparation | Final Manuscript  Due |
| 14 | 17-19 Apr | Oral Presentations |  |

HOW TO SUCCEED IN THIS CLASS?

Be driven, motivated, persistent, and positive

# STRATEGIES FOR GETTING A HIGH GRADE IN THIS COURSE

Again, NOTE: To pass this course, you must achieve a passing grade in BOTH the lecture and laboratory portions of the class. Please don’t use high performance in one part to justify less effort in the other!

* COME TO CLASS. We often hear students say they don't come to class because "it's all in the book." This is not true! Instructors draw from their own knowledge and expertise when preparing teaching materials, so we often cover topics and examples that you will not find in the book. You also have no way of knowing what material we emphasized or how, without coming to class. Most students cannot skip class regularly and still do well in this course. Plus, you can’t get iClicker points without being there to participate.
* KEEP UP. There is a lot of material covered in this course, do not expect to learn it the night before the exam! And it is VERY helpful to have read the material before you come to class.
* TAKE ADVANTAGE OF HELP. If you are having difficulty, or simply need clarification of some of the material, see either your laboratory Teaching Fellow or one of the instructors. We all hold office hours and intend for that time to be used helping students. But if you don't seek us out, there's no way for us to know that you're struggling. Free tutoring is also available. Look into the following opportunities:
* Supplemental Instruction. There will likely be a supplemental instructor for BCOR 12 through the Learning Co-op. We will post information when it becomes available.
* The Tutoring Center (http://www.uvm.edu/~leanco) offers a variety of academic support including study skills, time management, and test-taking tips.  Tri-Beta Society: Tutoring TBA will be posted on Blackboard.

# ACADEMIC HONESTY

Academic honesty is expected of all students. The University of Vermont has a very strict policy concerning academic honesty and plagiarism. Please see the statement on academic honesty http://www.uvm.edu/~uvmppg/ppg/student/acadintegrity.pdf . If you are caught cheating on an exam, you will receive a zero for that exam. That score cannot be the one you drop. All laboratory reports MUST be written individually unless specifically assigned as a group report.

Plagiarism constitutes a violation of Academic Honesty. Plagiarism of ANY sort - e.g., copying part or all of a fellow student's lab report, copying from original references, texts, or websites - will NOT be tolerated. The consequences of plagiarism or cheating range from a score of zero on the assignment or exam, failure in the course, to filing a complaint with the University’s Coordinator for Academic Honesty which can result in expulsion from the University.

COURSE CONTENT IS THE PROPERTY OF THE INSTRUCTOR.

Consistent with the University’s policy on intellectual property rights, all teaching and curricular materials (including but not limited to classroom lectures, class notes, exams, handouts, and presentations) are the property of the instructor. Therefore, electronic recording and/or transmission of classes or class notes is prohibited without the express written permission of the instructor. Such permission is to be considered unique to the needs of an individual student (e.g. ADA compliance), and not a license for permanent retention or electronic dissemination to others. For more information, please see the UVM policy on Intellectual Property, sections 2.1.3 and 2.4.1

# CLASSROOM RESPECT

It is import to maintain a respectful environment in class, and we expect this from all of you as you should expect this from us. You are here to learn and we are here to help you learn with mutual respect. Please arrive on time and do not leave early without permission. When you come to lecture and lab, please turn off your cell phone. We will not tolerate phone conversations or texting or email during lecture or lab. Come prepared to dedicate your full attention to your instructor and TA during lecture and lab. If your cell phone goes off in class, please leave the room and do not come back until the next class period.

EMAIL ETIQUETTE: Your Instructors and Teaching Fellows will make every effort to answer your emails promptly. Please return the courtesy by responding. Also, please address your queries respectfully. “Hey” does not fall in this category, and any such messages risk being ignored (perhaps the best litmus test is to ask the following: “if you were looking for a job, would you greet your prospective new employer in that manner?”). Also it is important to properly identify yourself and the particular course you are inquiring about. Instructors often have multiple “Biology” courses and multiple students with the same first name.

RELIGIOUS HOLIDAYS: Students should submit in writing to their instructors by the end of the second full week of classes their documented religious holiday schedule for the semester. Students who miss work for the purpose of religious observance will be allowed to make up this work.

STUDENT DISABILITY POLICY. In keeping with University policy, any student with a documented disability interested in utilizing accommodations should contact ACCESS, the office of Disability Services on campus. ACCESS works with students and faculty in to find reasonable and appropriate accommodations, which are communicated to faculty in an accommodation letter. We request that all students meet with one of us (Dr. May-Collado) to discuss the accommodations they need. Accommodation letters lists those accommodations that will not be implemented until the student meets with their faculty to create a plan; we are happy to help, but do need to know how to assist you, well in advance. Contact ACCESS: Room A170 Living/ Learning Center; 802-6567753; access@uvm.edu; or www.uvm.edu/access.