



ANIMAL BEHAVIOR: FUNDAMENTALS AND APPLICATIONS

Why do animals behave the way they do? Why do lions have manes while leopards don't? Why do elephants and bees live in groups but many other species do not? Why does your friendly neighborhood squirrel get so busy late in the fall and again in the spring? Why do certain wolves 'fish' but others never learn the technique? In this course we will explore the fundamentals of animal behavior and use that foundation to understand how we can better manage and conserve animal biodiversity. Labs will include hands-on experience with tools that will allow us to quantify behavior, develop ethograms, and understand species' repertoires. Three hours of lecture/discussion and three hours of laboratory each week.

COURSE LOGISTICS

Instructor: Prof. Stotra Chakrabarti; schakrab@macalester.edu

How to address me: I go by Stotra, Prof. Chakrabarti, or Dr. Chakrabarti. My pronouns are he/him/his.

Lecture: MWF 08:30 am - 09:30 am; OLRI 284

Lab: T 01:20 pm - 04:30 pm; OLRI 284

Office Hours: Monday, 12-1 PM, Tuesday 10-11 PM in OLRI 211, or by appointment. **I also have an open-door policy, even if the door is closed! So, please find me around if you need help. I am always around to hear your thoughts.**

Texts: Book chapters, readings and lab handouts will be made available through Moodle.

Prerequisites: BIOL/ENVI 170 and either BIOL180 or ENVI 240. Recommended: STAT 155

Email Policy: I will respond to emails promptly between 9AM-5PM on weekdays; emails received after 5PM can take longer to respond. I often cannot answer emails over the weekend, so please plan accordingly.

Course Presence: The course primarily relies on experience and exposure (discussions, dialogues, hands-on activities, observations etc), and it will greatly benefit students to 'participate and learn'. **You will earn most of the points if you just show up for class and labs!** I will expect students to attend lectures and labs regularly on time, unless there is an emergency (*which is absolutely fine*). You can take *4 leave of absences without questions* for the whole course, but an intimation would be appreciated. Please inform me beforehand if you need more time off. **I am committed to be extra-sensitive towards the flexibility that is required in the special times that we live in currently, so please let me know what I**

can do to make this course more accessible to you. If you are feeling perpetually low, remember we are going through a severe collective trauma for 18 months. It will have a significant, long-term effect on mental health. If you are getting out of bed and managing to do some things, then you are doing great!

Out of class work expectations: Readings, lab reports and other assignments should take ~1-3 hours. Longer assignments and group work, including presentations, will require more time to be scheduled. If you are having trouble working in a group setting due to work or class scheduling conflicts, please let me know. **Also, please do not be afraid to make mistakes, we only learn when we make them. Remember “why do we fall? So that we can learn to pick ourselves up!” We are going to make mistakes *together* and learn *together* in this course.**

Developing your voice in science: Science requires a balance of courage, humility and kindness – this is as true for undergraduates as it is for researchers at leading institutions. You need courage and confidence to pursue and develop new ideas and approaches, confidence to critique others’ ideas, and to follow your curiosity. But science also requires humility and empathy – identifying limitations, asking for advice, permissions, help and guidance, accepting appropriate criticism from others, and reflecting on improvement. **ASK QUESTIONS, CRITIQUE PEERS, BUT PLEASE DO SO WITH KINDNESS.** As you develop your thoughts and opinions in this class, be mindful that we are also collectively creating a community of learning.

LEARNING GOALS

This upper-level biology course will introduce you to the fine nuances of animal behavior. *However, there will be no ‘wand-waving’ or ‘incantations’ in my course, but together we will learn how to understand animals and their actions.* The course will examine the ecology and evolution of animal behavior. Current scientific readings, lab-based and other hands-on outdoor activities will be used to explore these topics. By the end of this course, you should be able to:

- Appreciate and wonder at the natural world.
- Understand what animals have to tell us!
- Interpret, critique, and evaluate scientific articles on animal behavior.
- Identify potential research questions from discussions on current literature.
- Ask and formulate behavioral questions.
- Gain familiarity with the study of animal behavior.
- Learn techniques used to study animal behavior for different species.

ASSESSMENTS

Mini-Quizzes: MQs will be held every other week or as in the class schedule. It will comprise of 5 question quizzes (generally on Mondays) based on class lectures and information. After completing the quiz (~10 min), students will work in small groups (2-4) to discuss answers, after which we will discuss them as a group. There will be a total of 5 MQs.

Lab Reports: Lab reports should comprise of a brief synthesis of the lab activities [lab will often comprise of outdoor field activities and watching/observing and working with wolves, coyotes and bears!]. There is no standard format, but it should include the aim, methods, results, and discussions and references (if required). Specific instructions will be given in each lab handout (check Moodle) as to whether a full report or a partial report is due. The lab report is usually due Tuesday morning at 10 AM (a week from active lab days). **Most of the work will be done in the lab, then you get AT LEAST A WEEK to edit, organize, beautify and submit!**

Paper Responses: Paper responses AND critique will be due by 10 AM Monday for weeks designated in the schedule. The reading material as well as prompts for discussion (if necessary) will be made available ahead of time on Moodle. **Paper responses will be held 4 times over the course, and you will get at least a week to prepare and submit.** Please check course schedule/Moodle for updates and timings. The responses will be discussed as a group in class.

Twitter summary: This will comprise of a gist of the paper in the form of 6-7 tweets. Students are allowed/expected to be creative in the use of images, memes, gifs etc. **There will be a total of 2 twitter summaries throughout the course.** Please check Course schedule/Moodle for timings.

Midterm: Midterm will comprise of aptitude based applied questions based on the syllabus covered so far. It will be an *open book exam* on Wednesday, October 20th. Students get time until Friday October 22nd 6 pm to submit.

Inspire talks: Students (in groups of 2) will make a short 15-minute presentation on a topic of choice. This will be followed by reflections where we will have an active discussion on each presentation. So, make sure to write down questions and comments for your peers when they are presenting and don't be shy to bring them up during the discussion. More details on Moodle.

Final: Finals will comprise of an outdoor observation based 'practical/experiential' test AND a short paper that you are expected to write (individually) on the topic pertaining to your INSPIRE TALK. The paper is aimed to help you consolidate suggestions and criticisms from your peers during your talk. While there is no fixed format for the paper, I would expect an abstract, intro, methods (Lit Rev), discussion, references (tables & figures are optional but helps ace any write-up)! Please check for updates on Moodle.

GRADING (no overlapping due dates for any assignments)

Assessment	Due	Points	Grade	%
MQs	Weekly (generally)	50 (10 pts each)	A	94-100
Lab Reports	Tuesday at 10 AM	200 (25 pts each)	A-	90-93.9
Paper Responses	Monday 10 AM	60 (15 pts each)	B+	87-89.9
Twitter summary	Monday 10 AM	20 (10 pts each)	B	83-86.9
Midterm	October 22	70	B-	80-82.9
Inspire Talk	November 22-24	50	C+	77-79.9
Final	Practical (November 16)	50	C	73-76.9
	Short Paper (December 17)	100	C-	70-72.9
Total		600	D+	67-69.9
			D	63-66.9

Extra Points/Credits for attending/participating in conferences/outside events related to the course (Animal Behavior) = 10 pts each! While only participation will give you points, you should also write an informal letter to me (not graded) elucidating the key take-home messages from the event/conference.

LEARNING ENVIRONMENT AND INCLUSIVITY.

The myriad of life-forms and their diverse behaviors have taught us that such diversity is the key to their strength and resilience. Taking cues from that, my goal is to promote an inclusive learning environment where diverse perspectives are recognized, respected, and seen as a source of strength. Part of that effort includes a recognition that all humans have inherent biases, and it is our responsibility to do our best to identify them and take preemptive actions. If something in or about this class makes you feel unwelcome and uncomfortable, please see me, your advisor, a professor you trust, or a college administrator.

Names and pronouns: You should be addressed in the manner that you prefer. If you want to make sure I address you with a particular name and/or pronoun, please let me know.

Title IX: Macalester College is committed to providing a safe learning environment for all students that is free of discrimination, sexual harassment, sexual assault, domestic violence, dating violence, and stalking. Further details are explained in the college's Title IX regulations (<https://www.macalester.edu/titleix>). If you, or someone you know, experiences a Title IX violation, know that Macalester has staff trained to support you. Macalester faculty members are "responsible employees," which means that if you tell me about a Title IX violation, I must share that information with

the Title IX Coordinator. Still, you will control how your case is handled, including whether you wish to pursue a formal complaint. Our goal is to make sure you are aware of the range of options available to you and have access to the resources you need (Title IX Office, 651- 696-6258) including, if you wish, confidential sources on campus who are not subject to the mandatory reporting requirement (see list of “Confidential On-Campus Support” at <https://www.macalester.edu/violenceprevention/support/>).

Accessibility: I want all students to have fair and equitable access to the learning opportunities in this course. If there are aspects of the instruction or design of this course that result in barriers to your inclusion or to accurate assessment of achievement, please notify me as soon as possible. Students are also welcome to contact the disability service office to discuss a range of options to removing barriers in the course, including accommodations (contact Disability Services, 651-696-6275 or disabilityservices@macalester.edu).

Once you have a letter of accommodations, please see me so that we can implement an action plan. Furthermore, I know that at times personal issues, stress, health problems or life circumstances may impact your ability to perform academically. Please contact the Office of Student Affairs at 651-696-6220 (studentaffairs@macalester.edu) for support and ask them to get in touch with your instructors.

Other helpful information to support your experience in the class:

- To address concerns on content or experience in the class, either find me before/after class; attend office hours; or email to set up a time to meet in person.
- If you need additional writing support, please check out *MAX Center* for writing tutors or *Works in Progress* peer review program (Kagin Commons, first floor)
 - You are not able to attend class due to an unexpected event (sickness, family or personal issues) - Contact me as soon as possible to set up a time to talk about options.
 - You are not able to attend class due to religious observance - Please let me know you will be observing ahead of time, so that you can obtain course materials ahead of the absence.
 - If you need an extension on the submission deadlines - Please let me know ahead of the deadline either through email or before/after class or office hours.
 - **Do you need time for yourself? Studentship can be overwhelming sometimes, and I want you to take care of yourself. Your wellbeing is of paramount importance and I do not want you to compromise on that, EVER! If you are finding it difficult to follow the scheduling or pace of this course, please let me know.**

All readings, assignment descriptions, and other information about the course will be on Moodle. Moodle will be updated frequently, so please check regularly.

THIS IS A COURSE TO ‘EDUCATE’ YOU ABOUT ANIMAL BEHAVIOR AND NOT CRAM THEORIES, SO PLEASE HAVE FUN WHILE YOU WORK THROUGH THE COURSE! ALSO, A SYLLABUS IS NOT A CONTRACT --- WE WILL REMAIN FLEXIBLE MUTUALLY



WEEKLY COURSE SCHEDULE [Tentative, please check moodle for updates & changes]

WEEK	DAYS	TOPIC		
1	Sept 1-3	Monday	Wednesday	Friday
		N/A	Personal Intro, Ice breaking, who's who	Intro to Animal Behavior, Tinbergen's 4 questions
		T: N/A		
2	Sept 6-10	LABOR DAY	Measuring & Describing behavior, Ethics of animal behavior research	Scan/Focal, States-Events
		T: 1. Prof. Lars Chittka's Tinbergen Lecture 2. Squirrel watching and wondering (outdoor activity)		
3	Sept 13-17	Mini Quiz, Discussion	Living in Groups	Living in groups
		Intro to sociality	Paper I provided (paper response and Twitter summary due next Monday)	
		T: Lab on meerkat activity (Lab report due next Tuesday morning)		
4	Sept 20-24	Cooperation & Altruism	Paper I responses and discussion	Radiotelemetry, animal capture theory
		T: Lab work cooperation and altruism (Lab report due next Tuesday morning)		
5	Sept 27-Oct 1	Mini Quiz & Discussion,	Case study on foraging in tropical carnivores	Foraging theory lecture
		Intro to Foraging theory	Paper II provided (paper response due next Monday)	Killing them with kindness: food subsidies
		T: Lab at Wild. Sc. Centre: observation and data-recording on wolves (Lab report due next Tuesday morning)		
6	Oct 4-8	Paper II discussion, Predator Prey lecture	Predator Prey Theory & Case Studies	Guest lecture on sleep ecology and predation in lizards: Dr. NP Mohanty
		T: Lab work at the Wild. Sc. Centre (capture, handling and immobilization of wolves) (Lab report due next Tuesday morning)		
7	Oct 11-15	Guest Lecture on Primate Sociality: Dr. DD Moor	Evolutionary Arms Race	Resource Competition
		T: Lab on Research Design & Hypothesis Building (Group Activity, lab report due same day)		
8	Oct 18-20	Resource Competition	MID TERM [Open Book]	FALL BREAK
		T: Movie screening – Jane		
9	Oct 25-29	Mini Quiz, Discussion, Intro to Mating systems	Mating systems	Sexual selection and conflict
		T: Data analyses/Activity (Lab report due next Tuesday morning)		
10	Nov 1-5	Mini Quiz and Discussion	Sexual selection and conflict	Parental care
		Paper III provided (paper response due next Monday)		
T: TBD#				
11	Nov 8-12	Paper III responses and discussion,	Guest lecture on sexual selection and conservation of fish: Dr. J Gumm	Animal Culture
		Paper IV provided (paper response and Twitter summary due next Monday)		
T: Lab work/activity on resource competition (Lab report due next Tuesday morning)				
12	Nov 15-19	Mini Quiz and Discussion	Paper IV responses and discussion.	Communication
		T: Practical/Experiential Exam (outdoor activity, part of finals)		
13	Nov 22-24	Inspire Talk	Inspire Talk	THANKSGIVING BREAK
		T: Inspire Talk and reflections		
14	Nov 29-Dec 3	Communication	Behavior and Conservation	Behavior and Conservation
		T: Communication/Sexual segregation Lab (Lab report due next Tuesday morning)		
15	Dec 6-10	Making Animal Behavior Research more inclusive: ABC	Murky concepts	Recap
		T: NO LAB, STUDY & WRITING TIME		

#TBD: To Be Decided

Recommended Study Materials:

While there is no textbook for this course and all reading materials (book chapters and articles) will be made available on Moodle, I recommend the following books for further reading, which I would also be referring to throughout the course:

1. *An Introduction to Behavioural Ecology*, 2nd Edition, JR Krebs & NB Davies, Blackwell Scientific Publications 1987
2. *An Introduction to Behavioural Ecology*, 4th Edition, NB Davies, JR Krebs & SA West, Blackwell Scientific Publications 2012
3. *Measuring Behaviour: An Introductory Guide*, 3rd Edition, P Martin & P Bateson, Cambridge University Press 2007
4. *Behavioral Ecology & Conservation Biology*, ed T Caro, Oxford University Press 1998