ANIMAL BEHAVIOR (BIO 405)
Spring 2021
TR 11:00-12:15 PM, 165 Science

INSTRUCTOR: Dr. Chris Maher
OFFICE: 201 Science (A Wing) or 178 Science (CSTH Dean's office, C Wing)
OFFICE PHONE: 780.4612 or 780.4377
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DROP-IN HOURS: T 12:30-1:30 PM, W 1:00-2:00 PM, or by appointment

COURSE DESCRIPTION: This course introduces you to the scientific study of animal behavior, i.e., it provides you with an overview of scientific methods, approaches to the study of animal behavior, and major behavioral principles and concepts. Animals do incredibly interesting things. However, this course does not focus on natural history *per se* (Animal Planet) or domestic animal psychology (why does my cat refuse to use the litter box?); it is a rigorous science course that uses hypothesis testing to explain the behavior of wild animals in their natural settings.

This syllabus is intended as a guide for the semester; however, I reserve the right to make changes in topics or schedules as necessary.

COURSE PREREQUISITES: You must have completed successfully (i.e., grade of C- or higher) either BIO 107 or BIO 113. If you have not met these prerequisites, please speak with me. Recommended courses include Genetics (BIO 201), Evolution (BIO 217), and Biostatistics (MAT 220).

COURSE MATERIALS:
Rubenstein, D.R. and Alcock, J. 2018. *Animal behavior: an evolutionary approach*. 11th ed. Oxford University Press, New York. [Required]
Pechenik, J. A. 2015. *A short guide to writing about biology*. 9th ed. Pearson, Boston. [Required; older editions are acceptable]

LEARNING OUTCOMES: Upon successfully completing this course, you should be able to:
1) explain major concepts of animal behavior from ultimate and proximate perspectives;
2) reason scientifically and interpret scientific data, including statistical information;
3) synthesize and critically analyze the primary literature of animal behavior;
4) understand the relevance of animal behavior; and
5) communicate scientific information effectively to others in written and spoken form.

EXPECTATIONS: This is a 400-level course in biology; therefore, I expect you to accept a greater share of the responsibility for learning than you would do in an introductory level course. I expect you to think for yourself and to analyze critically much of the information we discuss. To achieve the learning outcomes, you must arrive prepared for the day's events, which means you have read assignments prior to the start of class and you are prepared to discuss material with your peers. In other words, you must take an active role in the learning process. I expect you to commit 6-9 hours each week, in addition to scheduled class meeting time, to this course.

ASSESSMENT: The lab is not required for students enrolled in this course; yet some of you take the lab concurrently. Therefore, I have established two "tracks" for the purposes of grade determination. If you are taking the lab, your final grade will be determined somewhat differently than someone who is not taking the lab.

1) In-class writing tasks (20% of final grade): Writing tasks will assess your understanding of concepts (Learning Outcome 1), ability to reason scientifically and interpret information (Learning Outcome 2), and communication skills (Learning Outcome 5).

At the beginning of each class session, I will ask you to write a brief answer to a question I pose. The question may be related to material discussed in the previous class or to reading assignments. Questions may be somewhat "factual," and they also may require you to integrate and synthesize information. Memorizing lecture notes will not suffice.

The assignment should take 5-10 min, so do not be late to class. Students who arrive more than 5 min late will not be eligible to complete the day's task. I will drop your 4 lowest scores on these assignments. You cannot make up these tasks. If you miss class for some reason, that day's task can count toward the 4 dropped scores.

***2) Critiques (20% of final grade)*:** Critiques allow you to explore topics of behavior that most interest you. They also assess your scientific reasoning skills (Learning Outcome 2), ability to synthesize and analyze the primary literature (Learning Outcome 3), understanding of the relevance of the work (Learning Outcome 4), and communication skills (Learning Outcome 5).

Each student will write two short papers that summarize and critically analyze recent articles from the primary literature. Some rules to follow:

- Journal articles must be published since January 2017.
- Articles should come from the list of journals provided in a separate handout. Not all of these journals are behavioral journals, and they often contain behavioral papers. Be sure your chosen articles address a behavioral concept! (Check with me if you want to be sure.)
- The chosen article must be an empirical paper, not a review, i.e., it contains new data, analysis, and conclusions.
- You must provide either a copy of the article or a link to an online version of the article.

Each critique will contain the following components:

a. At the start of the critique, you should provide a **concise, 1-2 sentence summary** that captures the most important aspects of the paper.

b. Next, you **briefly summarize key aspects** of the paper, following the Scientific Process format (see separate handout), which includes identifying the research question (phrased as a question), hypothesis, predictions, methods, results, and conclusions. *You must paraphrase and summarize*; do not simply repeat the same information published in the paper.

c. Most importantly, you provide a **critical assessment** of the article in which you discuss most, if not all, of the following questions: Was the problem interesting and worthwhile? Was the methodological approach appropriate? Were the results conclusive? Do you accept the authors' conclusions? Are these conclusions important? What is the relevance of this work, both to the scientific community and to the general public?

In addition, each critique must conform to these requirements:

- Word processed (not handwritten)
- Double spaced with 1" margins on all sides
- 10-12 point font

- Do not include a separate title page, and be sure to put your name at the top of the first page.
- No spelling, punctuation, or grammatical errors

Please read chapter 7 in Pechenik for general advice about critiques (see other chapters of the book, too, for helpful hints about writing, in general). You will submit the assignments on Brightspace. No late assignments will be accepted.

- **FIRST CRITIQUE DUE SUNDAY, 28 FEB by 11:59 PM**
- **SECOND CRITIQUE DUE SUNDAY, 28 MAR by 11:59 PM**

3) Journal club (10% of final grade): Periodically throughout the semester, we discuss papers from the primary literature. The goal of this activity is to provide a forum in which to clarify concepts in animal behavior (Learning Outcome 1) and to develop critical thinking (Learning Outcomes 2, 3) and communication skills (Learning Outcome 5).

These papers will be available electronically at least one week prior to discussion. You should read the paper and make notes in a timely manner. Keep in mind that journal articles can be quite dense, and you may need to read the paper several times to truly understand it, so do not wait until the night before a journal club to prepare!

To be sure that everyone is ready to discuss the day's papers, **before the start of class, you will turn in:**

- **at least 3 discussion questions for each article; AND**
- **EITHER a brief summary of each article using the Scientific Process format, OR a 2-min video in which you explain each article to a hypothetical high school student**

For each session, 2-3 students act as facilitators. They choose the papers and email a PDF or a link to the paper to me at least one week before their scheduled journal club. Journal club papers must be different from papers chosen for critiques. Each facilitator briefly summarizes the paper and starts the discussion by offering a question, criticism, or comment on the paper's significance. They continue to direct discussion of that paper. Read chapter 11 in Pechenik for some tips.

These discussions are meant to be constructive. Some discussions may center on trying to understand what the issues really are. (Some issues have not been clarified in the literature.) Other discussions may be critical, and they, too, should be constructive, including alternative approaches to a problem. (We will not just "trash" a paper or idea.) Discussions also might involve the ramifications of ideas, i.e., insights that an idea offers into old problems.

Don't worry about speaking out! Students may be reluctant to speak because they fear they might say something stupid or cut down someone else. Everyone eventually says something dumb if they just speak off the top of their head during a long discussion. That's OK; just move on. Don't be afraid to ask questions. Scientists make their living asking questions.

Finally, these discussions typically involve criticism. Feel free to take issue with someone's ideas, and remember that the idea, not the person, is at stake. Assume that people will take issue with your ideas, and this dialogue does not constitute a personal attack against you. Respect each other and trust each other.

***4) Research project or review paper*:** We cannot begin to cover all topics in animal behavior, and students in this course have a wide range of interests. This assignment has several goals:

it enables you to explore, in greater depth, some topic of animal behavior of interest to you; it strengthens your ability to analyze and synthesize the primary literature (Learning Outcome 3); and it improves your critical thinking and writing skills (Learning Outcomes 4, 5). With these goals in mind, and to help you to understand the assignment, I provide you with feedback at several phases of the project; however, I encourage you to consult with me as many times as necessary. Students enrolled in lab conduct a research project that culminates in a poster presentation at Thinking Matters; students not enrolled in lab investigate a specific topic and write a review paper. No late assignments will be accepted at any phase of the project.

A word about the Internet: The Internet may contain interesting information; however, because anyone can post anything to the web, it is not an accepted scientific source, and you cannot use it for source materials in this course. Biologists subject their work to intense review by their peers prior to publication. Many journals now publish online, however, and you may use these publications because papers published electronically are peer reviewed.

We have access to a large number of journals electronically; yet many publishers place embargoes on journal contents, often for one year. Therefore, chances are high that you will have to make requests through Interlibrary Loan, particularly for papers published within the past year. They are fast; nonetheless, you need to plan and remember that materials may not be available to you immediately.

a) *Research project* (for students enrolled in lab): This project combines literature review, experimental design, data collection, data analysis, and production of a scientific poster. By investigating, planning and conducting a research project, you can explore some facet of behavior that interests you and actively engage in the process of "doing science." You can work on almost anything you want (keeping in mind resources available to you and federal and state regulations): animals in the field, animals in the lab, or domestic animals. I can help you to obtain equipment you may need to successfully carry out your project. You must submit a written proposal, a short abstract, 2 drafts, and a final poster.

You may work alone or in pairs on this project; however, if you choose to work with someone else, each student must keep track of the time and responsibilities that each individual puts into the project, and both students receive the same final grade.

<u>IACUC form</u>. If you choose to study vertebrates in any way other than simply observing them, then USM's Institutional Animal Care and Use Committee (IACUC) must approve your research. Furthermore, you must complete IACUC training online, which takes a few hours. The minimum time needed to complete the process is 2 weeks, and it may take longer. Therefore, you need to start early. To access the Animal Proposal Study Form, visit the IACUC website: usm.maine.edu/orio/institutional-animal-care-and-use-committee-iacuc. I will work with you on the form prior to you submitting it, and **you must submit the form to me by 11:59 PM on Sunday, 7 Feb**. *You may not begin to collect data until you have received IACUC approval*; therefore, we need to work quickly.

TOPIC DESCRIPTION: DUE SUNDAY, 31 JAN by 11:59 PM
To start the process, you will submit a brief description of the project that you would like to conduct, including the overall objective, study species, and study location. You are welcome to consult with me about ideas prior to the submission deadline.

PROPOSAL (5% of final grade): TWO COPIES DUE SUNDAY, 7 FEB by 11:59 PM
You must turn in a written proposal describing your project. Details are provided in a separate handout, and read Chapter 10 in Pechenik for additional information and suggestions. <u>The proposal should be word processed, double spaced, with 1" margins, numbered pages, and 10-12 point font</u>. Once you submit your proposal, you are not locked

into that particular project; things change and you may change your mind. However, I must approve all major changes.

ABSTRACT: DUE SUNDAY, 14 FEB by 11:59 PM
The deadline for submitting abstracts to Thinking Matters is Friday, 19 Feb. You must submit your abstract to me earlier so we have time to modify it before the conference deadline. Because your project obviously is not complete in mid February, the abstract should focus on the concept being studied, objectives and hypotheses, and methods, along with a statement about what you intend to present for results. It is limited to 1536 characters.

DRAFTS: Draft does not mean your first version, handwritten, and thrown together at the last minute. Consider this phase as a nearly final version of particular sections of your poster, with the layout planned. It should contain all the right elements in all the right places. I do not grade drafts; however, I make comments and suggestions. If you elect not to turn them in, you lose 5% of your total points at the end of the semester *for each missing draft*. You may submit drafts no later than the dates shown below.

Draft Introduction and Methods: Due Sunday, 7 Mar by 11:59 PM
Draft Poster: Due Sunday, 4 Apr by 11:59 PM

FINAL POSTER: SUBMIT BY 11:59 PM on SUNDAY, 18 APRIL
At scientific meetings, posters are popular ways to present research results. A poster is more of a visual presentation of research compared to a written paper; the idea is to convey to the observer, clearly and succinctly, the essence of your work. Thus, text is minimal; type is large and easy to read; graphs also are large and clearly understandable from a distance of about 0.5 m. The entire poster should measure 3' high x 4' wide. Students working in pairs produce one coauthored poster.

On Friday, 30 April, USM holds its annual conference, “Thinking Matters”, which highlights student research, scholarship and creativity. You will participate in this event, specifically the poster session. More information will be provided as it becomes available. See also: https://usm.maine.edu/thinkingmatters.

Consult chapter 11 in Pechenik for information about preparing posters; chapter 9 also has useful information about which material should be presented in each section. We will discuss the project and poster in more detail as the semester progresses. However, please talk to me whenever you have questions or need suggestions.

b) *Review paper* (for students not enrolled in lab): You will research and write a review that summarizes and synthesizes the recent primary literature concerning some topic in animal behavior of your choice. Do not focus on a particular species; instead, select a question that applies to more than one group of animals.

In the review paper, you answer the question you chose by summarizing information provided in the papers you read, and you also evaluate those papers critically, including methodology and interpretation of the data. You do not simply repeat what the authors wrote. You must synthesize the material and draw your own conclusions about the topic. You should include tables or figures because they help you to present your argument.

The review must include analysis of at least 4 closely related primary references (articles containing new data and analysis) published since 2010. The paper must present a clearly organized, logically sound, and carefully written argument that addresses a specific problem or question using information from the references. The review may contain additional secondary (review) references to help establish the context and scope of your argument.

TOPIC DESCRIPTION: DUE SUNDAY, 31 JAN by 11:59 PM
To be sure you have tackled a feasible subject and identified a suitable question, you must submit a brief explanation of the topic you will address in your review. You should include:

- the question you wish to address (framed as a question)
- a brief summary of the literature found thus far
- bibliographic information for at least two primary literature references you intend to analyze, using the format from *Animal Behaviour*.

I will not grade this description; however, if you elect not to turn it in, you lose 5% of your total points in the course.

ANNOTATED BIBLIOGRAPHY (5% of final grade): DUE SUNDAY, 14 FEB by 11:59 PM
The next step in writing the review paper is to prepare an annotated bibliography. For each reference, you should include the citation, followed by the annotation, which summarizes the paper and explains why you chose to use it, including how it relates to other papers that you included.

DRAFT SUMMARY TABLE: DUE SUNDAY, 7 MAR by 11:59 PM
Every good review paper contains at least one table that summarizes information compiled from the source material. The table forces you to synthesize across studies, highlighting common pieces of information. I will provide examples for guidance.

DRAFT: DUE SUNDAY, 4 APR by 11:59 PM
Draft does not mean the first version of your paper, handwritten, and thrown together at the last minute. You should consider this draft as the nearly final version. It should have all the right elements in all the right places. I do not grade this draft; I provide comments and suggestions. If you elect not to turn it in, you lose 5% of your total points. You may submit drafts before the due date shown above, and you may turn in more than one draft; however, I must receive at least one draft on or before 4 April.

The paper should be double spaced, with 1" margins, numbered pages, and 10-12 point font. Use the format depicted in *Animal Behaviour*. See chapter 7 in Pechenik for assistance.

FINAL PAPER: SUBMIT BY SUNDAY, 18 APRIL at 11:59 PM

5) Final exam (5% of final grade): The final exam consists of a discussion of 1-2 journal articles that I choose. In essence, it is one last journal club. I provide you with the articles one week before the scheduled exam, which will be held **Thursday, 6 May, 11:00 AM – 1:00 PM**. I ask each student specific questions about the papers, and we discuss them in much the same way we discussed other journal articles during the semester. You may write notes on the papers, and you may consult the papers during the exam.

GRADE DETERMINATION

For students taking BIO 405 only:	
In class writing tasks	20%
Critiques	25%
Journal club questions/participation	10%
Annotated bibliography	5%
Review paper	35%
Final exam	5%
TOTAL	100%

For students also taking BIO 406:	
In class writing tasks	20%
Critiques	25%
Journal club questions/ participation	10%
Written proposal	5%
Research poster	35%
Final exam	5%
TOTAL	100%

I use the highest score earned on an assignment as an indication of the best that students could do, and I curve from there, using the scale shown below. Final grades are determined in the same manner: I curve down from the highest number of points earned in the course. EXAMPLE: Suppose the highest score on an assignment is 9 out of 10 points. The cutoff for an A- would be 90% of 9 points, or 8.1 points. Likewise, the lowest B would be 7.2 points, the lowest C would be 6.3 points, and the lowest D would be 5.4 points. If you want to know your grade at any point during the semester, please contact me.

93-100%	A	87-89.9	B+	77-79.9	C+	67-69.9	D+
90-92.9	A-	83-86.9	B	73-76.9	C	63-66.9	D
		80-82.9	B-	70-72.9	C-	60-62.9	D-
						<60	F

COURSE EVALUATIONS: At the end of each semester every student has the opportunity to provide constructive feedback on the course. It is important to me that you take the time to let me know your thoughts about the course. I use your feedback to make improvements in course materials, assignments, and outcomes.

COURSE POLICIES

ATTENDANCE POLICY

I consider college students to be adults and thus responsible for making their own decisions about whether or not to attend class. However, you will complete a short writing assignment each day (see below), and we cover and discuss a substantial amount of material in class, so photocopying someone else's notes probably will not accurately reflect what we accomplish in class. One way to learn is to come to class, prepared both to learn and to participate in the day's activities.

CLASS CANCELLATION

In the event that I must cancel class suddenly for some reason, I will post an announcement and notification on Brightspace and contact you via email.

CLASS CANCELLATION/ATTENDANCE DUE TO INCLEMENT WEATHER

Occasionally, USM will close the University due to inclement weather. If the cancellation or closure affects our class, the class content will be made up at another time or through additional, outside of class, assignments.

When USM opens late or closes early, and the time selected is during the middle of class, we may or may not hold class, and I will notify you. Two examples:

- If class starts at 11:00 AM, and the University is closing at 12:00 PM, we will still have class unless you hear from me.
- If class starts at 11:00 AM, and the University is opening at 12:00 PM, we will not have class.

TECHNOLOGY IN THE CLASSROOM

With increased use of technology in classrooms, we also see an increase in the inappropriate use of devices during class. I do not wish to punish students who want to use computers legitimately, i.e., to take notes during class. However, to avoid distractions and to keep students focused on the class, I impose the following rules:

1. Students may use computers only to take notes and not for any other purpose.
2. To avoid distractions, students must mute their computers.
3. Students who wish to use laptops or tablets during class must sit in the front 1-2 rows.

Failure to comply with these rules will result in a ban on computer use for the remainder of the semester.

In addition, students may not use electronic devices (e.g., cell phone, smart phone, tablet, iPod, PDA, MP3 player, pager) during class to access email, instant messages, the Internet, or to send or receive text messages. Please turn off all cell phones and other similar devices prior to the start of class unless I have granted permission in advance to leave them on.

ACADEMIC INTEGRITY

Everyone associated with the University of Southern Maine is expected to adhere to the principles of academic integrity central to the academic function of the University. Any breach of academic integrity represents a serious offense. Each student has a responsibility to know the standards of conduct and expectations of academic integrity that apply to academic tasks. Violations of academic integrity include any actions that attempt to promote or enhance the academic standing of any student by dishonest means. Cheating on an examination, stealing the words or ideas of another (i.e., plagiarism), making statements known to be false or misleading, falsifying the results of one's research, improperly using library materials or computer files, or altering or forging academic records are examples of violations of this policy

which are contrary to the academic purposes for which the University exists. Acts that violate academic integrity disrupt the educational process and are not acceptable.

Evidence of a violation of the academic integrity policy will normally result in disciplinary action. A copy of the complete policy may be obtained from the office of Community Standards and Mediation, online at usm.maine.edu/community-standards-mediation/academic-integrity or by calling and requesting a copy at (207) 780-5242.

UNIVERSITY POLICIES AND RESOURCES

DISABILITY ACCOMMODATIONS

The university is committed to providing students with disabilities equal access to all university programs and services. If you think you have a disability and would like to request accommodations, please contact the Disability Services Center. Timely notification is essential. The Disability Services Center can be reached by calling 207-780-4706 or by email dsc-usm@maine.edu. If you have already received a faculty accommodation letter from the Disability Services Center and would like to request accommodations for this course, please provide me with that information as soon as possible. Please make a private appointment so that we can review your accommodations together.

HEALTH AND COUNSELING

Counseling is available at USM. The best way to schedule an appointment is by phone at 780-5411. More information is available at https://usm.maine.edu/uhcs.

RECOVERY ORIENTED CAMPUS CENTER (ROCC)

A peer support community for students in recovery from substance abuse and other mental health conditions is available at USM. More information may be found online at https://usm.maine.edu/recovery or by calling ROCC at 207-228-8141.

NONDISCRIMINATION POLICY AND BIAS REPORING

The University of Southern Maine is an EEO/AA employer and does not discriminate on the grounds of race, color, religion, sex, sexual orientation, transgender status, gender expression, national origin, citizenship status, age, disability, genetic information or veteran's status in employment, education, and all other programs and activities. The following person has been designated to handle inquiries regarding non-discrimination policies: Amie Parker, Interim Director of Equal Opportunity, The Farmhouse, University of Maine Augusta, Augusta, ME 04333, 207.581.1226, TTY 711 (Maine Relay System). Incidents of discrimination or bias at USM should be reported to Associate Vice President for Student Affairs David Roussel at 207-780-5242.

STATEMENT ON RELIGIOUS OBSERVANCE FOR USM STUDENTS

Absence for Religious Holy Days: The University of Southern Maine respects the religious beliefs of all members of the community, affirms their rights to observe significant religious holy days, and will make reasonable accommodations, upon request, for such observances. If a student's religious observance is in conflict with the academic experience, they should inform their instructor(s) of the class or other school functions that will be affected. It is the student's responsibility to make the necessary arrangements mutually agreed upon with the instructor(s).

TITLE IX STATEMENT
The University of Southern Maine is committed to making our campuses safer places for students. Because of this commitment, and our federal obligations, faculty and other employees are considered mandated reporters when it comes to experiences of interpersonal violence (sexual assault, sexual harassment, dating or domestic violence, and stalking). Disclosures of interpersonal violence must be passed along to the University's Deputy Title IX Coordinator who can help provide support and academic remedies for students who have been impacted. More information can be found online at **http://usm.maine.edu/campus-safety-project** or by contacting Sarah E. Holmes at **usm.TitleIX@maine.edu** or 207-780-5767.

If students want to speak with someone confidentially, the following resources are available on and off campus: University Counseling Services (207-780-4050); 24 Hour Sexual Assault Hotline (1-800-871-7741); 24 Hour Domestic Violence Hotline (1-866-834-4357).

POLICY ON ACCEPTABLE CONDUCT IN CLASS SETTINGS
If a student substantially disrupts a class, the professor may ask the student to align with this policy on conduct in a class setting. If the student refuses, the professor may, at their discretion, ask the student to leave. If the professor takes this step, they must attempt to communicate with the student and provide informal counsel and advice. The professor may elect to notify their dean of the situation as well. If the student disrupts the class again, the professor may, at their discretion, provide a written notification to the student, describe the offending behavior, and refer the student's case to the appropriate academic dean and notify the dean of students that an official student conduct code violation has occurred [https://usm.maine.edu/community-standards-mediation/conduct-process].

COVID FACE COVERING REQUIREMENT
Per USM and the University of Maine System, all students, faculty, and staff members are required to wear a face covering, including during all face-to-face classes. Resident students are exempted from this requirement when in their own room in the residence hall.
Students seeking additional exceptions from this requirement should refer to the DISABILITY ACCOMMODATIONS section of this syllabus. https://www.maine.edu/together/community-guidance/everyone/