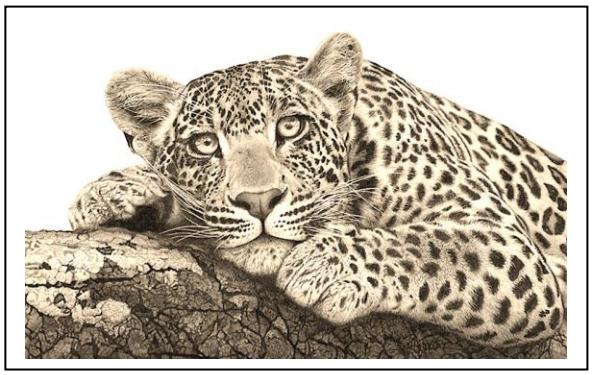
Biology 4030 Syllabus
Animal Behavior
Fall 2022



But ask the animals, and they will teach you, or the birds of the air, and they will tell you; or let the fish of the sea inform you. Which of all these does not know that the hand of the Lord has done this? (Job 12: 7-10, NIV)

Catalog Course Description :

BIO 4030-Animal Behavior (3 units)
An exploration of the behavioral biology of animals, building on the foundation of Tinbergen's Four Problems and incorporating the insights of ethology, psychology, behavioral ecology, and cognitive ethology. Topics include proximate and ultimate mechanisms, behavioral genetics, developmental ethology, neurophysiology, learning, communication, reproduction, sexual selection, parasite and predator defense, mating systems, parental behavior, and sociality. The evolutionary basis of behavior is emphasized, including natural selection, developmental genetics, and domestication. Guest lectures and films expand on the reading and lecture content, and conservation issues are explored. Prerequisite: BIO 2011

BIO 4030L-Lab (1 unit) - A laboratory that is a co-requisite for BIO 4030 in which students complete a semester-long team research project at the San Diego Zoo.

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Office hours:
Make an appointment (office or Zoom)

TA/Grader: Rachel Loeffler, Senior Environmental Science major
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Texts: Animal Behavior, 9th edition by John Alcock; Sinauer, 2009; ISBN 9780878932252.

Measuring Behavior, 4th edition, by Melissa Bateson & Paul Martin; Cambridge University Press, 2021; ISBN 9780521535632

Equipment: iClicker2 remote for class participation and quizzes

Meetings:				
	Lecture:	MWF	1:30-2:25	Rohr Science 40
	Lab:	Monday	2:45-6:15 PM	Rohr Science 40

Student Learning Outcomes:
Upon completion of the course, you will be able to:

- state Tinbergen's four problems and identify questions as being either proximate or ultimate
- explain how behavior develops on the proximate level and give hypotheses for behavioral differences
- design, execute, and interpret an original research project based on behavioral observations
- argue for the possession of emotions, self-awareness, and consciousness in non-human animals
- articulate the importance of behavior to the practice of conservation biology

COURSE DESIGN

(1) Textbook Readings and Guided Questions: I have prepared a set of guided questions for each topic reading in the Alcock ninth edition textbook that will be posted on Canvas. The guided questions are designed to: (1) help you focus on the information that is most relevant to this course, (2) prepare you for the clicker review quizzes and the midterm exams, and (3) give you the foundational knowledge needed for activities.

(2) Canvas: All the class material will be on the Canvas site, and assignments will be submitted via Canvas and graded online. All assignments have a due date, so try to stay current. Note that CANVAS DOES NOT SUPPORT PAGES – you may submit Word or PDF documents. Your grader and I will often give you feedback on Canvas, so be sure to set up Canvas to alert you when you get comments.

(3) Late Assignments: Late penalties will apply for all assignments submitted after the due date. For labs and journal article assignments (20 pts), 2 points will be deducted for each day late (no points after 10 days). A proportionately similar penalty will be applied for assignments of different point values. The intent of late penalties is to encourage you to turn in your work on time, and to be fair to those who do turn in their work on time. However, if you have a legitimate reason for submitting an assignment late, please tell me (by emailing directly) and the grader (by including a note in the text box when you submit).

(**4**) **Academic Honesty**: The PLNU policy on academic honesty is listed under the institutional policies below. My experience is that many students are not aware that some of their regular practices are considered plagiarism. For example, while you are free to discuss readings and lecture material among yourselves, I expect that you will each do your own work on individual assignments. In this case, teaming up with other students to write joint answers is plagiarism. Do not share electronic files of your answers to an assignment with another student. Copying and pasting answers to assignments from online sources is very much plagiarism – use your own words and ideas!

(5) iClicker2 Remotes: Our class meetings will consist of a combination of lecture and small group activities. To enable participation by everyone, I require you to have an iClicker2 remote for use in every class. Your answers will be recorded and points assigned based on class participation (being engaged in class activities) and performance (getting the right answer). Weekly review quizzes are based on the reading assignments.

(6) Course Attendance Policy: Regular and punctual attendance is important for optimal achievement, and is a requirement for this course. There will be an attendance clipboard for you to sign in with at every class meeting. You are permitted five (5) absences without penalty. Excessive unexcused absences will result in points being deducted from your Attendance Participation grade.

(7) Journal Articles: A crucial ingredient in the process of becoming a scientist is the reading and interpretation of journal articles. We will read several classic animal behavior articles relevant to our current topic. Each topic will involve a different task, such as writing an abstract, identifying the hypotheses being tested, and so forth.

(8) Labs: The first few labs will involve training sessions on the methodology of conducting behavioral research, which will prepare you for your field research project at the San Diego Zoo or Safari Park. The final lab is reserved for Zoom presentations of your research projects.

(9) Exams: Exams will be administered during lab periods using your iClicker2 in the 'self-paced' mode. Exams will consist of a combination of multiple choice questions and some short answers or essays. The final exam will be semi-cumulative, meaning that key concepts will be included from the entire semester. A study guide will be available on Canvas for each exam.

(10) Field Research Project: Each of you will work with a team/partner to conduct a zoo research project involving behavioral observations at the San Diego Zoo or Safari Park. I will be working with zoo staff (Greg Vicino, Louisa Radosevich, and Jessica Sheftel) to identify behavioral research projects that will be most beneficial for zoo management and student learning – you will then be assigned a project. As part of our mutual arrangement with the zoo, each student will receive a semester entrance passe to access the zoo or safari park. Once you start the on-site behavioral observations, plan to conduct observations at least once a week for 8 weeks to get a good sample size – 15-20 hours of observations per student is the goal. Following completion of the field work, you will analyze your data and write a scientific report based on journal article format. All project reports are required to have a data analysis and literature review component to them (I will give you specific guidelines). You will give a PowerPoint presentation (plus Q&A) during the final lab meeting which will be either on Zoom or recorded so that they will be available to the zoo managers. Teams will complete peer review reports at the semester's end.

Grading Criteria

Points are estimates and may change

• Guided questions 20 @ 10 pts	200
• Attendance points	50
• iClicker Participation points	50
• Midterm exams - 2 @ 100 pts	200
• Cumulative final exam	100
• Labs/Guest Lecture - 5 @ 20 pts	100
• Journal article assignments – 5 @ 20 pts	100
• Team research paper	100
TOTAL POINTS	**900**

LETTER GRADES:			
A	90%	C	70%
A-	88%	C-	68%
B+	86%	D+	66%
B	80%	D	60%
B-	78%	D-	58%
C+	76%	F	< 58%

PLNU INSTITUTIONAL POLICIES

PLNU Mission: To Teach ~ To Shape ~ To Send
Point Loma Nazarene University exists to provide higher education in a vital Christian community where minds are engaged and challenged, character is modeled and formed, and service becomes an expression of faith. Being of Wesleyan heritage, we aspire to be a learning community where grace is foundational, truth is pursued, and holiness is a way of life.

General Education: This course is one of the components of the General Education Program at Point Loma Nazarene University, under the category of "Exploring an Interdependent World." By including this course in a common educational experience for undergraduates, the faculty supports an introduction to the natural and social sciences as tools for exploring the world, with emphasis on collecting and interpreting empirical data for both theoretical and practical purposes. PLNU provides a foundational course of study in the liberal arts informed by the life, death, and resurrection of Jesus Christ. In keeping with the Wesleyan tradition, the curriculum equips students with a broad range of knowledge and skills within and across disciplines to enrich major study, lifelong learning, and vocational service as Christ-like participants in the world's diverse societies and cultures.

PLNU Attendance and Participation Policy: Regular and punctual attendance at all classes is considered essential to optimum academic achievement. If the student is absent from more than 10 percent of class meetings, the faculty member can file a written report which may result in de-enrollment. If the absences exceed 20 percent, the student may be de-enrolled without notice until the university drop date or, after that date, receive the appropriate grade for their work and participation. See Academic Policies in the Undergraduate Academic Catalog.

PLNU Academic Honesty Policy: Students should demonstrate academic honesty by doing original work and by giving appropriate credit to the ideas of others. Academic dishonesty includes plagiarism, fabrication, deception, or impersonation. Plagiarism is the act of presenting information, ideas, or concepts as one's own when in reality they are the result of another person's creativity and effort. Such acts include copying assignments from another student, or copying and pasting answers from the reading into your answer – both involve using someone else's words as if they were your own. Much of the learning process involves articulating the answer in your own words, so bypassing this step will almost guarantee an inadequate understanding of the material. Please write using your own words, and no copy-pasting! A faculty member who believes a situation involving academic dishonesty has been detected may assign a failing grade for that assignment or examination. See Academic Policies for definitions of kinds of academic dishonesty and further policy information.

PLNU Academic Accommodations Policy: While all students are expected to meet the minimum standards for completion of this course as established by the instructor, students with disabilities may require academic adjustments, modifications or auxiliary aids/services. At Point Loma Nazarene University (PLNU), these students are requested to register with the Disability Resource Center (DRC), located in the Bond Academic Center. (DRC@pointloma.edu or 619-849-2486). The DRC's policies and procedures for assisting such students in the development of an appropriate academic adjustment plan (AP) allows PLNU to comply with Section 504 of the Rehabilitation Act and the Americans with Disabilities Act. Section 504 (a) prohibits discrimination against students with special needs and guarantees all qualified students equal access to and benefits of PLNU programs and activities. After the student files the required documentation, the DRC, in conjunction with the student, will develop an AP to meet that student's specific learning needs. The DRC will thereafter email the student's AP to all faculty who teach courses in which the student is enrolled each semester. The AP must be implemented in all such courses.

If students do not wish to avail themselves of some or all of the elements of their AP in a particular course, it is the responsibility of those students to notify their professor in that course. PLNU highly recommends that DRC students speak with their professors during the first two weeks of each semester about the applicability of their AP in that particular course and/or if they do not desire to take advantage of some or all of the elements of their AP in that course.

PLNU Copyright Policy: PLNU, as a non-profit educational institution, is entitled by law to use materials protected by the US Copyright Act for classroom education. Any use of those materials outside the class may violate the law.

PLNU Final Examination Policy: Successful completion of this class requires taking the final examination on its scheduled day. The final examination schedule is posted on this syllabus. No requests for early examinations or alternative days will be approved unless you have 3 final exams scheduled on the same day or another compelling reason.

ANIMAL BEHAVIOR CLASS SCHEDULE - FALL 2022

DATE	TOPIC	CHAPTER
Aug 30-31	An introduction to animal behavior	1
Sept 5	**LABOR DAY**	
Sept 2-9	Proximate and ultimate causes of behavior	2
Sept 12 - JOURNAL ARTICLE #1		
Sept 12-16	The development of behavior: focus on genes	3
Sept 19-23	The development of behavior: focus on environment	4
SEPT 26 - JOURNAL ARTICLE #2		
Sept 26-30	Control of behavior: neural mechanisms	4
Oct 3-7	Organization of behavior: neurons and hormones **Exam 1-Monday Oct 3**	5
Oct 10-14	Behavioral adaptations	6
OCT 17 - JOURNAL ARTICLE #3		
Oct 17-19	Parasite defense and animal medicine	Hart & Hart 2018
Oct 21	**FALL BREAK**	
Oct 24-28	Evolution of feeding behavior	7
OCT 31 - JOURNAL ARTICLE #4		
Oct 31-Nov 4	Evolution of communication	8
Nov 7-11	Evolution of reproductive behavior	9
Nov 14-18	Evolution of mating systems **Exam 2 – Monday Nov 7**	10
Nov 21-28	Evolution of parental care	11
NOV 30 - JOURNAL ARTICLE #5		
Nov 30-Dec 2	Evolution of social behavior	12
Nov 23-25	**THANKSGIVING RECESS**	
Nov 5-9	Evolution and domestication of dogs	Optional readings
Dec 3	**FINAL EXAM Friday Dec 16 1:30-4:00 pm**	

ANIMAL BEHAVIOR LAB SCHEDULE - FALL 2022

Wed	Presenter / Topic	Reading
Aug 30	Behavioral Observation Methods I	B&M: Ch. 1-4
Sept 5	**LABOR DAY**	
Sept 12	Behavioral Observation Methods II	B&M: Ch. 5-8
Sept 19	Behavioral Observation Methods III	San Diego Zoo
Sept 26	Zoo Research Project	
Oct 3	Zoo Research Project	
Oct 10	Zoo Research Project	
Oct 17	Zoo Research Project	
Oct 24	Zoo Research Project	
Oct 31	Zoo Research Project	
Nov 7	Zoo Research Project	
Nov 14	Zoo Research Project	
Nov 21	Zoo Research Project	
Nov 28	Zoo Research Project	
Dec 5	**Research Project Presentations**	

* B&M = Bateson & Martin ‘Measuring Behavior’ text

Alcock Text Reading - Guided Questions 2022

- Each reading worth 10 points unless otherwise indicated

Week	Chapter	Section	Pages
(1) Aug 30-31	1-An evolutionary approach to animal behavior (5 pts)	• Levels of analysis: 8-11 • B&M: 30-32	9
(2) Sept 2-9	2-Understanding the causes of bird song	• Proximate causes: 29-43 • Ultimate causes: 43-59	31
(3) Sep 12-16	3-Development of behavior (Heredity)	• Introduction: 64-72 • Role of Genes: 76-87	21
(4) Sep 19-23	3-Development of behavior (Environment)	Role of environment: 87-104	18
(5) Sep 26-30	4-Control of behavior: Neural mechanisms	Neurons & stimulus filtering: 107-131	25
(6) Oct 3-7	5-Organization of behavior	• Neurons hormones: 149-153 • Biological rhythms: 153-167	19
(7) Oct 10-14	6-Behavioral adaptations for survival	pp. 183-202	20
(8) Oct 17-19	Adaptive responses to parasites	How mammals stay healthy (Hart & Hart 2018)	6
(9) Oct 24-28	7-Evolution of feeding behavior	• Optimal foraging: 219-228 • Waggles & spices: 228-246	28
(10) Oct 31-Nov 4	8-Evolution of communication	• Hyena pseudopenis: 287-294 • Honest signals: 294-326	40
(11) Nov 7-11	9-Evolution of reproductive behavior	Pages 329-375	46
(12) Nov 14-18	10-Evolution of mating systems	Pages 379-418	40
(13) Nov 21-28	11-Evolution of parental care	Pages 421-503	82
(14) Nov 30-Dec 2	12-Evolution of social behavior	Pages 421-503	82
(15) Dec 5-9	Evolution and domestication of dogs	Optional readings available	

Classic journal articles in Animal Behavior – FA2022

Article #	Citation	Due Date
1	Marler P, Tamura M (1964). Culturally transmitted patterns of vocal behavior in sparrows. Science 146: 1483-1486	Sept 12
2	Garcia J, Koelling RA (1966). Relation of cue to consequence in avoidance learning. Psychonomic Science 4: 123-124.	Sept 26
3	McComb, K (1987). Roaring by red deer stags. Nature 330:648-649.	Oct 17
4	Zach R (1979). Shell dropping: decision-making and optimal foraging in northwestern crows. Behaviour 68:106-117.	Oct 31
5	Andersson M (1982). Female choice selects for extreme tail length in a widowbird. Nature 299:818-820.	Nov 30