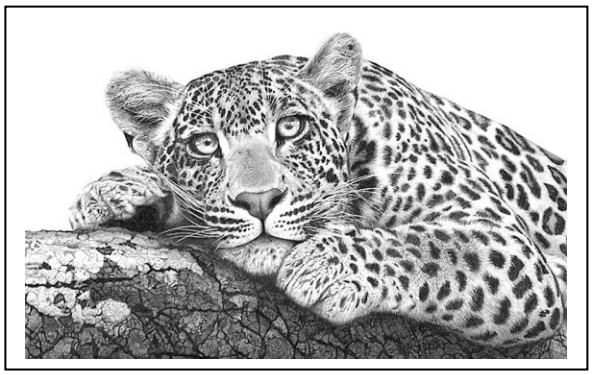
Biology 4030 Syllabus
Animal Behavior
Fall 2020



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.

Instructor:	Dr. Mike Mooring 104A Rohr Science Building Telephone: (619) 849-2719 E-mail: mmooring@pointloma.edu Office hours: drop by, or by appointment			
TA/Grader:	Hannah Mathews, Senior Environmental Science major E-mail: edeer022@pointloma.edu			
Texts:	Animal Behavior, 9th edition by John Alcock; Sinauer, 2013; ISBN 9780878932252. Measuring Behavior, 3nd edition, by Paul Martin & Patrick Bateson; Cambridge University Press, 2007; ISBN 9780521535632			
Equipment:	iClicker REEF Student Web for class participation via laptop / tablet / smartphone			
Meetings:	Lecture: Lab:	Tues-Thurs Wed	1:30-2:45 2:45-6:15 PM	Latter 02 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 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 iClicker REEF review quizzes and the midterm exams, and (3) give you the foundational knowledge needed for activities.

(2) Canvas: Being that we are online, 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 not submitting an assignment on time, 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; if they use your answers you are also guilty of plagiarism. Copying and pasting answers to assignments from online sources is very much plagiarism – use your own words and ideas!

(5) iClicker REEF Student Web: The synchronous meetings will consist of a combination of lecture and small group activities. To enable participation by everyone in a large class, I require you to have the iClicker REEF app loaded on your device (laptop, tablet, or smartphone) for use with quizzes and other activities. Your REEF 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. Your iClicker REEF score at the end of the semester will be your REEF participation score.

(6) Course Credit Hour Information: In the interest of providing sufficient time to accomplish the stated Course Learning Outcomes, this class meets the PLNU credit hour policy for a 4 unit class delivered over 15 weeks. It is anticipated that students will spend a minimum of 37.5 participation hours per credit hour on their coursework. For this course, students will spend an estimated 150 total hours meeting the course learning outcomes. The time estimations are provided in the Canvas modules.

(7) Course Attendance Policy: Regular and punctual attendance of the synchronous sessions is important for optimal achievement, and is a requirement for this course. Whenever you sign in to a synchronous session on Canvas Zoom YOUR ATTENDANCE WILL BE TAKEN. You are permitted three (3) absences without penalty. Excessive unexcused absences will result in points being deducted from your Attendance Participation grade. I realize that some of you may be in a different time zone, so be sure to account for any time zone changes on your calendar so that you do not miss a synchronous session!

(8) 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.

(9) 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, Safari Park, or a regional zoo near your home. The final lab is reserved for Zoom presentations of your research projects.

(10) Exams: Exams will be administered on Canvas using the Honorlock system, and will consist of a combination of multiple choice questions and some short answer or essays. The final exam will be semi-cumulative, meaning that key concepts will be included from the semester. A study guide will be available on Canvas for each exam. For Honorlock, you will need to insure that you have a computer with a webcam, reliable internet service, and a somewhat private learning space. Please email me if you have any technology challenges so that we can help you get access to these materials.

(11) Field Research Project: Each of you will work conduct a zoo research project involving behavioral observations at the San Diego Zoo or another zoo I am working with zoo staff to identify exhibits and behavioral data that will be most beneficial to the zoo and you will be assigned a project. For student in the San Diego area, I have arranged entrance passes to the San Diego Zoo or Safari Park. For students outside of the San Diego area, I will work with your local zoo to organize an entrance pass and research suggestions. You will work in teams when possible. 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. Following completion of the field work, you will analyze your data and write a scientific report due on Canvas and based on journal article format. All projects are required to have a data analysis and literature review component to them (I will give you specific guidelines). You will give a brief PowerPoint presentation (plus Q&A) to the class during the final lab meeting to share what you have learned. Teams will complete peer review reports at the semester's end.

Grading Criteria

Points are estimates and may change

• Guided questions 20 @ 5 pts	100
• Attendance points	50
• iClicker Participation points	50
• Midterm exams - 2 @ 100 pts	200
• Cumulative final exam	100
• Lab/Guest Lectures - 10 @ 20 pts	200
• Journal article assignments - 6 @ 20 pts	120
• Team research paper	100
TOTAL POINTS	**920**

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 is the act of presenting information, ideas, and/or concepts as one's own when in reality they are the results of another person's creativity and effort. A faculty member who believes a situation involving academic dishonesty has been detected may assign a failing grade for that assignment or examination, or, depending on the seriousness of the offense, for the course. Faculty should follow and students may appeal using the procedure in the university Catalog. 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 2020

DATE	TOPIC	CHAPTER
Aug 18-20	An introduction to animal behavior	1
Aug 25-27	Proximate and ultimate causes of behavior	2
AUG 28 - JOURNAL ARTICLE #1		
Sept 1-3	The development of behavior: focus on heredity	3
Sept 8-10	The development of behavior: focus on environment	3
SEPT 11 - JOURNAL ARTICLE #2		
Sept 15-17	Control of behavior: neural mechanisms	4
Sept 22-24	Organization of behavior: neurons and hormones **Exam 1-WED SEPT 23**	5
Sept 29-Oct 1	Behavioral adaptations	6
OCT 2 - JOURNAL ARTICLE #3		
Oct 6-8	Parasite defense and animal medicine	Hart 2011
Oct 13-15	Evolution of feeding behavior	7
OCT 16 - JOURNAL ARTICLE #4		
Oct 20-22	Choosing where to live	8
Oct 27-29	Evolution of communication **Exam 2 – WED OCT 28**	9
Nov 3-5	Evolution of reproductive behavior	10
NOV 6 - JOURNAL ARTICLE #5		
Nov 10-12	Evolution of mating systems	11
Nov 17-19	Evolution of parental care and social behavior	12-13
NOV 20 - JOURNAL ARTICLE #6		
Nov 24	Evolution and domestication of dogs	Grimm 2015; MacLean & Hare 2015
Dec 3	**FINAL EXAM THURSDAY DEC 3: 1:30-4:00 pm**	

ANIMAL BEHAVIOR LAB SCHEDULE - FALL 2020

Wed	Presenter / Topic	Reading
Aug 19	Behavioral Observation Methods I	M&B: Ch. 1-4
Aug 26	Behavioral Observation Methods II	M&B: Ch. 5-8
Sept 2	Behavioral Observation Methods III	San Diego Zoo
Sept 9	Zoo Research Project	
Sept 16	Zoo Research Project	
Sept 23	Zoo Research Project	
Sept 30	Zoo Research Project	
Oct 7	Zoo Research Project	
Oct 14	Zoo Research Project	
Oct 21	Zoo Research Project	
Oct 28	Zoo Research Project	
Nov 4	Zoo Research Project	
Nov 11	Zoo Research Project	
Nov 18	Research Project Presentations	

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

Alcock Text Reading - Guided Questions 2020

Week	Chapter	Section
(1) Aug 18-20	1-An evolutionary approach to animal behavior	Levels of analysis: 8-11
(2) Aug 25-27	2 and 3-Understanding the causes of bird song	(2) Proximate causes: 29-43 (3) Ultimate causes: 43-59
(3) Sep 1-3	4-Development of behavior (Heredity)	Introduction: 64-72 Role of Genes: 76-87
(4) Sep 8-10	5-Development of behavior (Environment)	Role of environment: 87-104
(5) Sep 15-17	6-Control of behavior: Neural mechanisms	
(6) Sep 22-24	7 and 8-Organization of behavior	(7) Neurons hormones: 149-153 (8) Biological rhythms: 153-167
(7) Sep 29-Oct 1	9-Behavioral adaptations for survival	pp. 183-202
(8) Oct 6-8	10-Adaptive responses to parasites	Pillars of medicine (Hart 2011)
(9) Oct 13-15	11 and 12-Evolution of feeding behavior	(11) Optimal foraging: 219-228 (12) Waggles & spices: 228-246
(10) Oct 20-22	13-Choosing where to live	
(11) Oct 27-29	14 and 15-Evolution of communication	(14) Hyena pseudopenis: 287-294 (15) Honest signals: 294-326
(12) Nov 3-5	16-Evolution of reproductive behavior	
(13) Nov 10-12	17-Evolution of mating systems	
(14) Nov 17-19	18-Evolution of parental care 19-Evolution of social behavior	
(15) Nov 24	20-Evolution and domestication of dogs	Grimm 2015; MacLean & Hare 2015

Classic journal articles in Animal Behavior - 2020

Article #	Citation	Due Date
1	Marler P, Tamura M (1964). Culturally transmitted patterns of vocal behavior in sparrows. Science 146: 1483-1486	Wed Aug 28
2	Garcia J, Koelling RA (1966). Relation of cue to consequence in avoidance learning. Psychon. Science 4: 123-124.	Wed Sept 11
3	McComb, K (1987). Roaring by red deer stags. Nature 330:648-649.	Wed Oct 2
4	Zach R (1979). Shell dropping: decision-making and optimal foraging in northwestern crows. Behaviour 68:106-117.	Wed Oct 16
5	Mooring MS, McKenzie AA, Hart BL (1996). Grooming in impala: Role of oral grooming in removal of ticks and effects of ticks in increasing grooming rate. Physiology and Behavior 59: 965-971.	Wed Nov 6
6	Andersson M (1982). Female choice selects for extreme tail length in a widowbird. Nature 299:818-820.	Wed Nov 20

BIO 4030 – ANIMAL BEHAVIOR
Fall 2020, Online Class Schedule

***** all times are Pacific Time (PT)

Assume 3 min per page

Date	Class Content	Assignment Due	Min
Module 1: Introduction to the study of animal behavior			
Week 1: Aug. 18-20			
Tues, Aug. 18	Zoom Class: 1:30-2:15 pm	Alcock Chapter 1 Tinbergen's 4 levels of analysis (8-11)	45 12
Wed., Aug. 19	Zoom Lab: 2:45-3:15 pm	Methods of animal behavior research AZA Video Series	30 164
Thu., Aug 20	Zoom Class: 1:30-2:15 pm		45
Module 2: Proximate and ultimate causes of behavior			
Week 2: Aug. 25-27			
Tues., Aug. 25	Zoom Class: 1:30-2:15 pm	Alcock Chapter 2-3 Proximate causes of behavior (29-43) Ultimate causes of behavior (43-59)	45 42 48
Wed., Aug. 26	Zoom Lab: 2:45-3:15 pm	Journal Article assignment #1 Methods of animal behavior research Practice AZA Video Ch. 5	10+50 30 60
Thu., Aug. 27	Zoom Class: 1:30-2:15 pm		45
Module 3: Development of behavior: focus on heredity			
Week 3: Sept. 1-3			
Tues., Sept. 1	Zoom Class: 1:30-2:15 pm	Alcock Chapter 4 Introduction (64-72) Role of Genes (76-87)	45 24 33
Wed., Sept. 2	Field Lab: San Diego Zoo	Field trip for practice sampling methods	210
Thu., Sept. 3	Zoom Class: 1:30-2:15 pm		45
Module 4: Development of behavior: focus on environment			
Week 4: Sept. 8-10			
Tues., Sept. 8	Zoom Class: 1:30-2:15 pm	Alcock Chapter 5 Role of environment (87-104)	45 51
Wed., Sept. 9	Field Lab: San Diego Zoo	Journal Article assignment #2	6+50
Thu., Sept. 10	Zoom Class: 1:30-2:15 pm		45
Module 5: Control of behavior: neural mechanisms			
Week 5: Sept. 15-17			
Tues., Sept. 15	Zoom Class: 1:30-2:15 pm	Alcock Chapter 6 (105-148)	45 129
Wed., Sept. 16	Field Lab: San Diego Zoo	Video: Animal Language (50 min)	90
Thu., Sept. 17	Zoom Class: 1:30-2:15 pm		45
Module 6: Organization of behavior: neurons and hormones			
Week 6: Sept. 22-24			
Tues., Sept. 22	Zoom Class: 1:30-2:15 pm	Alcock Chapter 7-8 Neurons and hormones (149-153) Biological rhythms (153-167)	45 12 42

Wed., Sept. 23	Field Lab: San Diego Zoo	Exam 1 (Honorlock)	120 300
Thu., Sept. 24	Zoom Class: 1:30-2:15 pm		45
Module 7: Behavioral adaptations			
Week 7: Sept. 29-Oct. 1			
Tues., Sept. 29	Zoom Class: 1:30-2:15 pm	Alcock Chapter 6 Behavioral adaptations (183-202)	45 19
Wed., Sept. 30	Field Lab: San Diego Zoo	Journal Article assignment #3	6+50
Thu., Oct. 1	Zoom Class: 1:30-2:15 pm		45
Module 8: Parasite defense and animal medicine			
Week 8, Oct. 6-8			
Tues., Oct. 6	Zoom Class: 1:30-2:15 pm	Hart (2011) reading (12 pp.) Pillars of medicine	45 36
Wed., Oct. 7	Field Lab: San Diego Zoo	Video: Animal Medicine (50 min)	90
Thu., Oct. 8	Zoom Class: 1:30-2:15 pm		45
Module 9: Evolution of feeding behavior			
Week 9, Oct. 13-15			
Tues., Oct. 13	Zoom Class: 1:30-2:15 pm	Alcock Chapter 11-12 Optimal foraging (219-228) Waggles and spices (228-246)	45 27 54
Wed., Oct. 14	Field Lab: San Diego Zoo	Journal Article assignment #4	60+50
Thu., Oct. 15	Zoom Class: 1:30-2:15 pm		45
Module 10: Choosing where to live			
Week 10, Oct. 20-22			
Tues., Oct. 20	Zoom Class: 1:30-2:15 pm	Alcock Chapter 13 (247-286) Choosing where to live	45 117
Wed., Oct. 21	Field Lab: San Diego Zoo	Video: Animal Emotions (50 min)	90
Thu., Oct. 22	Zoom Class: 1:30-2:15 pm		45
Module 11: Evolution of communication			
Week 11, Oct. 27-29			
Tues., Oct. 27	Zoom Class: 1:30-2:15 pm	Alcock Chapter 14-15 Hyena pseudopenis (287-294) Honest signals (228-246)	45 21 54
Wed., Oct. 28	Field Lab: San Diego Zoo	Exam 2 (Honorlock)	120 300
Thu., Oct. 29	Zoom Class: 1:30-2:15 pm		45
Module 12: Evolution of reproductive behavior			
Week 12, Nov. 3-5			
Tues., Nov. 3	Zoom Class: 1:30-2:15 pm	Alcock Chapter 16-17 Evolution of reproductive behavior Evolution of mating systems	45 60 60
Wed., Nov. 4	Field Lab: San Diego Zoo	Journal Article assignment #5	21+50
Thu., Nov. 5	Zoom Class: 1:30-2:15 pm		45
Module 13: Evolution of mating systems			
Week 13, Nov. 10-12			

Tues., Nov. 10	Zoom Class: 1:30-2:15 pm	Alcock Chapter 18-19 Evolution of parental care Evolution of social behavior	45 60 60
Wed., Nov. 11	Field Lab: San Diego Zoo		
Thu., Nov. 12	Zoom Class: 1:30-2:15 pm		45
Module 14: Evolution of parental care and sociality			
Week 14, Nov. 17-19			
Tues., Nov. 17	Zoom Class: 1:30-2:15 pm	Readings on dog domestication: Grimm 2015; MacLean & Hare 2015 (8 pp.)	45 24
Wed., Nov. 18	Project Presentations	Journal Article assignment #6	10+50
Thu., Nov. 19	Zoom Class: 1:30-2:15 pm		45
Module 15: Evolution and domestication of dogs			
Week 15: Nov. 24			
Tues., Nov. 24	Zoom Class: 1:30-2:15 pm	Wrapping up	45
FINALS WEEK			
Week 16: Nov. 30-Dec. 4			
Thu., Dec. 3	Final Exam: 1:30-4:00 pm	Exam 3 Final (Honorlock)	120 400

TOTAL READING TIME = 655 MIN = 11 HOURS ~ 12 HOURS
TOTAL SEAT TIME = 1575 MIN = 26 HOURS
JOURNAL ARTICLES = 250 MIN = 4.2 HOURS ~ 5 HOURS
VIDEO ASSIGNMENTS = 270 MIN = 4.5 HOURS ~ 5 HOURS
EXAMS = 360 MIN + 1000 MIN STUDY = 23 HOURS
METHODS OF ANIMAL BEHAVIOR VIDEOS = 224 MIN = 3.7 HOURS ~ 4 HOURS
TOTAL = 75 HOURS