

## ANS 6905 Applied Statistics for Animal Sciences

**Fall 2023 - August 24 to December 12**

**Class Number: 19283**

**Section: 0225**

**Offered Fall Semester on Odd Years**

- 1. Course Description:** The course is offered on odd years and designed for graduate students in animal or veterinary sciences with some knowledge of statistics. The focus will be on basic concepts of linear models, experimental design, and data analyses. The goal is for students to be able to plan and interpret the most typical experimental designs and perform the most common analyses of data including interpretation of software outputs. The software SAS STAT will be used as the platform for data analyses.
- 2. Course units:** This is a 4-credit course that includes lectures and labs.
- 3. Pre-requisites:** No pre-requisite course required, although it is expected that students should have some understanding of basic concepts on experimental design and data analyses.
- 4. Course location:** Animal Sciences (Building 499), Room 201 (classroom on the second floor of the Animal Sciences building). Students on campus are expected to attend class in person. Students away from campus will be able to attend the course via Zoom (<https://ufl.zoom.us/j/6490656162>) in the classroom at their research location. All lectures will be recorded and posted on the website of the course in CANVAS under the UF E-Learning site for anyone to review the course materials, lectures, and labs.
- 5. Instructor (s):** José Eduardo P. Santos ([jeptosantos@ufl.edu](mailto:jeptosantos@ufl.edu)).
- 6. Teaching assistant (s):** Mariana Nehme Marinho ([mariana.nehme@ufl.edu](mailto:mariana.nehme@ufl.edu)).
- 7. Office hours:** Open door policy. Send me an e-mail message if you prefer. Contact the TA as you need.
- 8. General scope:** Experimental design and proper data analyses are critical processes for scientific research. The planning and performing research studies have statistical implications that influence how results are interpreted. The fundamentals of regression models, experimental design, and data analysis will be taught through a combination of lectures, exercises, and case studies for use with computer programming and final data interpretation. Common examples from animal and veterinary science studies will be used to illustrate course principles.

**9. Course Objectives:** At the end of this course, students will be acquainted with the basic principles of linear models, experimental design, and data analysis and they will be familiar with the most common statistical methods used in experiments in the animal sciences. At completion of this course, students should be able to:

- Proper use of regression models;
- Select the most appropriate experimental design for a particular experiment or study;
- Understand the differences between experiments and observational studies;
- Understand the different observational study designs;
- Properly identify the experimental unit and fixed and random effects on a statistical model;
- Calculate sample size;
- Select the most appropriate method of analysis of data;
- Prepare the data for analyses and identify potential mistakes with the data;
- Determine the most appropriate model that fits the data; and
- Interpret the results of the data analyses.

**10. Meeting times:** Fall semester, Tuesdays and Thursdays, periods 7 and 8 (1:55 PM – 3:50 PM EST).

**11. Material and Supply Fees:** No fee.

**12. Textbooks and Software Required:** Although no textbook is required, the students are highly encouraged to read different books. Below is a list of suggested books. In addition, lecture notes will be provided through e-learning.

- Biostatistics for Animal Science (M Kaps and WR Lamberson)
- Design and Analysis of Experiments (DC Montgomery)
- Logistic Regression Using SAS: Theory and Application, 2<sup>nd</sup> Edition (Paul Allison)
- SAS for Mixed Models, Introduction and Basic Concepts (Walter W. Stroup et al.)
- Introduction to Linear Regression Analysis (DC Montgomery, EA Peck, GG Vining)

The SAS STAT Software ([http://www.sas.com/en\\_us/software/sas9.html](http://www.sas.com/en_us/software/sas9.html)) will be used during laboratory exercises. As a University of Florida graduate student, you should be able to have access to SAS through the SAS UFApps for Students.

**11. Attendance and Expectations:** Requirements for class attendance, completing quizzes and take home assignments, and other work in this course are consistent with university policies that can be found at:

<https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/>

All students are expected to attend class. Cell phones should be turned off in class. Reading newspapers, working on assignments for other classes, or other activities that are not part of the class are not allowed during class time.

**12. Grading:** Grades will be based on exams (mid-term and final exams, 55% of the grade), weekly quizzes (26% of the grade), assignments including take-home exercises (15% of the grade), and class participation (4%). The grading scale is shown below, and it agrees with the UF grading policies. Contact me ahead of time if for any reason you are unable to take the exams on the scheduled dates. For those attending the course away from campus, you are expected to be in Gainesville for the final exam. For the first exam and quizzes, students away from campus are expected to find a faculty member in their research location to proctor them.

Remember, participation in class is part of the grading system.

1 point corresponds to 1%.

### Exams and points

	Percentage of final grade	Due Date/Date of Exam
1 <sup>st</sup> Exam	25.0%	October 12
2 <sup>nd</sup> Exam (Final exam)	30.0%	December 12
Quizzes	26.0%	Entire semester
Take home exercises	15.0%	Entire semester
Class participation	4.0%	Entire semester
Total	100%	

### Grading scale (% total points)

A = 93-100	A- = 88-92.9	B+ = 85 to 87.9	B = 81-84.9	B- = 78-80.9	C+ = 75-77.9
C = 71-74.9	C- = 68-70.9	D+ = 65-67.9	D = 61-64.9	D- = 58-60.9	E < 58

For more information on UF grades and grading policies, please visit:

<https://gradcatalog.ufl.edu/graduate/regulations/>

- 13. Class policies:** Students will be expected to work on their own during the labs although discussions on how to approach problems are encouraged. Exercise assignments will be provided for each topic and will be used for grading the course. No cell phone use during class or exams. Do not hesitate to contact the instructor if you are having difficulties with the course.
- 14. Class recording:** Although the course is face to face, all lectures will be recorded in Zoom and students attending this course will be able to access the recordings that will be posted after class. Let me know if you are unwilling to have your image recorded if you are attending the lecture online. As in all courses, unauthorized recording and unauthorized sharing of recorded materials is prohibited.
- 15. Online course evaluation process:** Student assessment of instruction is an important part of efforts to improve teaching and learning. At the end of the semester, students are expected to provide feedback on the quality of instruction in this course using a standard set of university and college criteria. Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at: <https://gatorevals.aa.ufl.edu/students/>. Students will be notified when the evaluation period opens and can complete evaluations through an e-mail they will receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluera.com/ufl/>. Summaries of course evaluation results are available to students at: <https://gatorevals.aa.ufl.edu/public-results/>.
- 16. Honesty Policy:** As a student at the University of Florida, you have committed yourself to uphold the Honor Code, which includes the following pledge: "*We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity.*" You are expected to exhibit behavior consistent with this commitment to the UF academic community, and on all work submitted for credit at the University of Florida, the following pledge is either required or implied: "*On my honor, I have neither given nor received unauthorized aid in doing this assignment.*" It is assumed that you will complete all work independently in each course unless the instructor provides explicit permission for you to collaborate on course tasks (e.g. assignments, papers, quizzes, exams). Furthermore, as part of your obligation to uphold the Honor Code, you should report any condition that facilitates academic misconduct to appropriate personnel. It is your individual responsibility to know and comply with all university policies and procedures regarding academic integrity and the Student Honor Code. Violations of the Honor Code at the University of Florida will not be tolerated. Violations will be reported to the Dean of Students Office for consideration of disciplinary action. For more information regarding the Student Honor Code, please see: <http://www.dso.ufl.edu/sccr/process/student-conduct-honor-code>.

**17. Accommodation for Students with Disabilities:** The Disability Resource Center coordinates the needed accommodations of students with disabilities. This includes registering disabilities, recommending academic accommodations within the classroom, accessing special adaptive computer equipment, providing interpretation services and mediating faculty-student disability related issues. Students requesting classroom accommodation must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student who must then provide this documentation to the Instructor when requesting accommodation.

Contact 0001 Reid Hall, 352-392-8565, <https://disability.ufl.edu/>

**18. Software use:** All faculty, staff and students of the university are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against university policies and rules, disciplinary action will be taken as appropriate.

**19. Campus helping resources:** Students experiencing crises or personal problems that interfere with their general well-being are encouraged to utilize the university's counseling resources. The Counseling & Wellness Center provides confidential counseling services at no cost for currently enrolled students. Resources are available on campus for students having personal problems or lacking clear career or academic goals, which interfere with their academic performance.

- University Counseling & Wellness Center, 3190 Radio Road, 352-392-1575, [www.counseling.ufl.edu](http://www.counseling.ufl.edu)

Counseling Services  
Groups and Workshops  
Outreach and Consultation  
Self-Help Library  
Wellness Coaching

- U Matter We Care, [www.umatter.ufl.edu/](http://www.umatter.ufl.edu/)
- Career Connections Center, First Floor JWRU, 392-1601, <https://career.ufl.edu/>
- Student Success Initiative, <http://studentsuccess.ufl.edu>.

Student Complaints:

- Residential Course: <https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/>
- Online Course: <https://distance.ufl.edu/state-authorization-status/#student-complaint>

**20. Diversity Statement:** The Department of Animal Sciences believes an inclusive, equity-minded environment includes access to higher- and continued education. We develop flexible, efficient, and accessible learning environments that welcome and support diversity. Diversity can include disability, age, socioeconomic status, ethnicity, race, nationality, religion, gender identity, sexuality, and culture. We expect all our community members (students, staff, and faculty) to act respectfully towards others (online and in person) and to utilize differences of opinion as learning opportunities. We also want you to feel comfortable asking for reasonable accommodation so that all students can participate in this course equitably. Please consult the Disability Resource Center <https://disability.ufl.edu/> for further questions.

**21. Course content:**

- Simple Linear Regression
- Multiple Linear Regression
- Checking Model Assumptions
- Model Variable Selection
- Generalized Linear Models
- Introduction to Time to Event Analysis
- Observational Studies
- Experimental Design: Basic Concepts
- Completely Randomized Design
- Randomized Design with Factorial Arrangement of Treatments
- Randomized Complete Block Design
- Split-Plot Design
- Latin Square Design
- Mixed-Effects Models
- Special Topics

**22. Course schedule:** Details of the UF calendar for the Fall of 2023 is available at <https://catalog.ufl.edu/UGRD/dates-deadlines/pdfs/calendar2023.pdf>

**See attached table with course schedule**

## ANS 6905 - Applied Statistics for Animal Sciences

### Schedule of Lectures - Fall 2023

Week	Date	Weekday	Topic	Instructor
1	08/24/23	THUR	Simple Linear Regression	JS/MM
2	08/29/23	TUE	Multiple Linear Regression I	MM
2	08/31/23	THUR	Multiple Linear Regression II	MM
3	09/05/23	TUE	<i>Lab 1 - Linear Regression</i>	JS/MM
3	09/07/23	THUR	Checking Model Assumption I	JS/MM
4	09/12/23	TUE	Checking Model Assumption II	JS/MM
4	09/14/23	THUR	<i>Lab 2 - Checking Model Assumption</i>	JS/MM
5	09/19/23	TUE	Model Variable Selection	MM
5	09/21/23	THUR	<i>Lab 3 - Model Variable Selection</i>	MM
6	09/26/23	TUE	Generalized Linear Model I	JS/MM
6	09/28/23	THUR	Generalized Linear Model II	JS/MM
7	10/03/23	TUE	<i>Lab 4 - Generalized Linear Model</i>	JS/MM
7	10/05/23	THUR	Introduction to Time to Event Analysis	JS/MM
8	10/10/23	TUE	<i>Lab 5 - Survival Analysis</i>	MM
8	10/12/23	THUR	<b>Exam I</b>	MM
9	10/17/23	TUE	Observational Studies	JS/MM
9	10/19/23	THUR	Experimental Design - Basic Concepts	JS/MM
10	10/24/23	TUE	<i>Lab 6 - Blocking, Covariate and Sample Size Calculation</i>	MM
10	10/26/23	THUR	Completely Randomized Design	MM
11	10/31/23	TUE	Comparing Treatment Means	JS/MM
11	11/02/23	THUR	Randomized Design with Factorial Arrangement of Treatments	JS/MM
12	11/07/23	TUE	Randomized Complete Block Design	JS/MM
12	11/09/23	THUR	<i>Lab 7 - Factorial Arrangement of Treatments</i>	MM
13	11/14/23	TUE	Latin Square Design	JS/MM
13	11/16/23	THUR	<i>Lab 8 - Randomized Block and Latin Square Design</i>	JS/MM
14	11/21/23	TUE	Mixed Effects Model I	JS/MM
14	11/23/23	THUR	<i>Holiday No Class</i>	
15	11/28/23	TUE	Mixed Effects Model II	JS/MM
15	11/30/23	THUR	<i>Lab 9 - Mixed Effects Models</i>	JS/MM
16	12/05/23	TUE	Review of course and special topics	JS/MM
16	12/07/23	THUR	<i>No Class Reading Day</i>	
17	12/12/23	TUE	<b>Exam II</b>	JS/MM

JS: José Santos

MM: Mariana Marinho