

## **ANS 6905 Applied Statistics for Animal Sciences (Fall 2019)**

1. **Course Description:** The course is designed for graduate students in biological sciences with some prior knowledge of statistics. The focus will be on basic concepts of linear and generalized linear models, experimental design, and data analysis. The popular software SAS and also R will be used as platforms 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.
4. **Course location:** Animal Sciences (Building 459), Room 102
5. **Instructors:**  
Francisco Peñagaricano ([fpenagaricano@ufl.edu](mailto:fpenagaricano@ufl.edu))  
José Eduardo Santos ([jepsantos@ufl.edu](mailto:jepsantos@ufl.edu))
6. **Teaching Assistants:**  
Mackenzie Dickson ([mj.dickson@ufl.edu](mailto:mj.dickson@ufl.edu))  
Lihe Liu ([lihe.liu@ufl.edu](mailto:lihe.liu@ufl.edu))  
Hugo Monteiro ([hmonteiro@ufl.edu](mailto:hmonteiro@ufl.edu))
7. **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 generalized linear models, experimental design, and data analysis will be taught through a combination of lectures, computer labs, and assignments. Common examples from animal science studies will be used to illustrate course principles.
8. **Course Objectives:** At the end of this course, students will be acquainted with the basic principles of generalized linear models, and experimental design, and they will be familiar with the most common statistical methods used in biological 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
  - Select the most appropriate method of data analysis
  - Determine the most appropriate model that fits the data
  - Interpret the results of the data analysis
9. **Meeting times:** Fall, Tuesdays and Thursdays, periods 7 and 8 (1:55 PM – 3:50 PM)
10. **Material and Supply Fees:** No fee.

11. **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.

- Introduction to Linear Regression Analysis (DC Montgomery, EA Peck, GG Vining)
- Design and Analysis of Experiments (DC Montgomery)
- Design and Analysis of Experiments (Dean, Voss, and Draguljic)
- Biostatistics for Animal Science (M Kaps and WR Lamberson)
- A Modern Approach to Regression with R (SJ Sheather)
- Design and Analysis of Experiments with SAS (J Lawson)
- Design and Analysis of Experiments with R (J Lawson)

Both SAS STAT Software ([http://www.sas.com/en\\_us/software/sas9.html](http://www.sas.com/en_us/software/sas9.html)) and also R software (<https://www.r-project.org/>) will be used during labs.

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

<https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>.

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

13. **Grading:** Grades will be based on exams (mid-term and final exams, 50% of the grade), weekly quizzes (30% of the grade), and assignments including take-home exercises (20% of the grade). The grading scale is shown below.

A	93 – 100%
A-	90 – 92%
B+	87 – 89%
B	83 – 86%
B-	80 – 82%
C+	77 – 79%
C	73 – 76%
C-	70 – 72%
D+	67 – 69%
D	63 – 66%
D-	60 – 62%

For more information on UF grades and grading policies, please visit:  
<http://gradcatalog.ufl.edu/content.php?catoid=2&navoid=762#grades>

14. **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.
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. These evaluations are conducted online at <https://evaluations.ufl.edu>. Evaluations are typically open for students to complete during the last two or three weeks of the semester; students will be notified of the specific times when they are open. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/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 0001 Reid Hall, 352-392-8565, [www.dso.ufl.edu/drc/](http://www.dso.ufl.edu/drc/).
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/cwc/](http://www.counseling.ufl.edu/cwc/)

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

*Career Resource Center, First Floor JWRU, 392-1601, [www.crc.ufl.edu/](http://www.crc.ufl.edu/)*

For emergencies, contact the University Police Department: 392-1111 or 9-1-1.

**Campus helping resources:** Students experiencing crises or personal problems that interfere

## 20. Course content:

- Simple Linear Regression
- Multiple Linear Regression
- Checking Model Assumptions
- Model Variable Selection
- Generalized Linear Models
- Observational Studies
- Experimental Design: Basic Concepts
- Completely Randomized Design
- Comparing Treatment Means
- Factorial Design
- Randomized Complete Block Design
- Latin Square Design
- Mixed Effect Models