**Anth 470 / 570 Statistical Analysis in Biological Anthropology**  
**Winter 2022 - online**

**Professor:** Drs. Steve Frost, Frances White, and Colin Brand  
**Dr. Frost’s office hours:** Wednesdays 9 to 11 am on zoom (see link in Canvas)  
**Dr. White’s office hours:** Mondays 3 to 5 pm and/or by appointment, on zoom or Condon Hall 302C (please email me that you are coming!)  
**Telephone:** Dr. Frost: 346-5161; Dr. White: 346-5278  
**E-mail:** sfrost@uoregon.edu and fwhite@uoregon.edu

This is an asynchronous online class. The class is in 10 weekly modules. It is a team-taught class with contributions from all of us!

**Warning: Timing, weeks, and deadlines** - We have taught this course in both regular term and in the shorter (4 week) summer term format. Some of the lectures were recorded in the summer format and may refer to this shorter timeline. This regular term offering of the course has been organized into 10 weeks, but you should move at your own pace, planning to finish by the end of week 10. Quizzes, Exams and assignments have target deadlines, but there is no late penalty. All work needs to be completed and submitted by Monday of Finals week.

**Prerequisites:** Permission of Instructor. Demonstration of statistical knowledge and background from introductory level classes such as Math 111, Math 243, or equivalent classes.

**Short course description:**

The important methods in biometry (biological statistics) and their inherent assumptions, limitations, interpretations, and common uses (and misuses) as relevant to biological anthropology.

**Learning Outcomes:**

- Identify the main univariate and bivariate and some multivariate statistical tests used in biological anthropology  
- Distinguishing between parametric and non-parametric approaches  
- Outline the procedure for selecting appropriate tests for different types of data and hypotheses  
- Explaining the interpretation, and limits, of the results of these tests and there relevance to the hypotheses under test  
- Calculating the results from most major tests using computer statistical programs

**Course content:**

This course is designed for upper-level undergraduates and beginning graduate students with some statistical knowledge and background. Our goal is to provide you with a firm grounding in the statistical analysis of data from the field of biological anthropology. We intend to teach you a sophisticated knowledge of important methods in biometry (biological statistics) and their inherent values, assumptions, limitations, and common uses (and misuses). Our approach will be to teach you to use the Sokal and Rohlf textbook Biometry as a future resource as well as to aid your current understanding. Successful completion of this course will enable you to logically design research projects, to analyze your data in a correct, appropriate, and powerful fashion, and to understand and critically evaluate statistical analyses in the literature.

In this course we will briefly cover probability statistics, descriptive statistics, hypothesis testing and experimental design. We will then cover the different parametric and non-parametric methods of statistical analysis of
analysis of variance (anova), correlation, linear regression, frequency analysis, and special topics such as time series data
and randomization tests. Analyses will be introduced using univariate data, and bivariate and multivariate applications will be covered where appropriate. Throughout this class, there are a series of computer labs to introduce you to using Excel for data organization and R for statistical analysis and graphical presentation.

All exams and quizzes in this class are open book and are an important part of your learning in this class. There are 5 required computer labs. This is, however, a class on understanding statistics and not on R programming and the labs serve to provide you with access and hopefully sufficient understanding to carry out statistical tests. Therefore, there are 4 points for each submitted lab exercise, regardless of its functionality! A functioning version of each lab will be provided after your submission.

**Undergraduate Student Grading:** The final grade for undergraduates will be based on:

- Midterm exam 1 10%
- Midterm exam 2 20%
- Quizzes 20%
- Computer exercises 20%
- Final exam 30%

**Graduate student grading:**

- Midterm exam 1 10%
- Midterm exam 2 20%
- Quizzes 20%
- Computer exercises 20%
- Final exam 20%
- Research data analysis and write-up 10%

**Graduate Student Research data analysis report:** Graduate students will submit a reflective report on how they see they may apply either one or more of the statistical approaches presented in their class to their own research. This report should be open-ended for instructor feedback on these applications. Students who already have data sets ready for analysis may contact the Profs for help with their analysis.

**Textbooks:**
The textbook for this class is Sokal and Rohlf, *Biometry*, Freeman. It is available in a Red (4th edition) or a Blue (3rd edition) but is currently out of print, so a PDF version of the third edition is provided.
<table>
<thead>
<tr>
<th>Week</th>
<th>Topic (biased approximation – this is an asynchronous class so you may work at a different pace)</th>
<th>Ch (Sokal &amp; Rohlf)</th>
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<tbody>
<tr>
<td>Week 1</td>
<td>Descriptive statistics, parametric and non-parametric</td>
<td>1, 2, 3, 4</td>
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<td>Probability distributions, normality</td>
<td>5, 6</td>
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<td>Week 2</td>
<td>LAB: Introduction to labs, moving data around and descriptive statistics in Excel</td>
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<td>Hypothesis testing, transformations</td>
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<td>Week 3</td>
<td>Analysis of variance</td>
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<td>Single classification anova</td>
<td>9</td>
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<td>Week 4</td>
<td>LAB: testing for normality, assumptions and transformations, single class anova (Model I)</td>
<td>13</td>
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<td>Midterm 1: descriptive statistics, definition of terms, single class anova, normality and transformations</td>
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<td>Week 5</td>
<td>Model II and mixed model single class anova, multiple comparisons (planned and unplanned)</td>
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<td>Model II two-level nested anova, correspondence across classes</td>
<td>10</td>
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<td>Week 6</td>
<td>Mixed model and multi-level nested anova. Model I, II and mixed model two-way anova, with and without replication</td>
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<td>Non-parametric anova. Multiway anova with and without replication, Model I, II and mixed.</td>
<td>13, 12</td>
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<td>Week 7</td>
<td>LAB: non-parametric anova, nested and two-way anova, multiple comparisons.</td>
<td>13 section 13.11</td>
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<td>Midterm 2: Multiple comparisons. Nested, 2-way multi-way, and non-parametric anova.</td>
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<td>Week 8</td>
<td>Linear regression: Model I, with and without replication</td>
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<td>Analysis of covariance, multiple regression, non-linear regression. Correlation</td>
<td>15, 16</td>
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<td>Week 9</td>
<td>LAB: regression and correlation, parametric and non-parametric.</td>
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<td>Frequency analysis.</td>
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<td>Week 10</td>
<td>LAB: frequency analysis, special topics</td>
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<td>Special topics (distribution free methods, time series, randomization tests)</td>
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**Academic Disruption due to Campus Emergency**

“In the event of a campus emergency that disrupts academic activities, course requirements, deadlines, and grading percentages are subject to change. Information about changes in this course will be communicated as soon as possible by email, and on Canvas. If we are not able to meet face-to-face, students should immediately log onto Canvas and read any announcements and/or access alternative assignments. Students are also expected to continue coursework as outlined in this syllabus or other instructions on Canvas.

In the event that the instructor of this course has to quarantine, this course may be taught online during that time.”

**COVID Containment Plan for Classes**

As the University of Oregon returns to in-person instruction, the key to keeping our community healthy and safe involves **prevention, containment, and support**. Here is information critical to how the UO is responding to COVID-19.

- **Prevention**: To prevent or reduce the spread of COVID-19 in classrooms and on campus, all students and employees:
  1. Must comply with [vaccination policy](#)
  2. Must wear face coverings in all indoor spaces on UO campus
  3. Complete weekly testing if not fully vaccinated or exempted
  4. Wash hands frequently and practice social distancing when possible
  5. Complete daily self-checks
  6. Stay home/do not come to campus if feeling symptomatic
  7. Complete the UO [COVID-19 case and contact reporting form](#) if you test positive or have been in close contact with a confirmed or presumptive case.

- **Containment**: If a student in class tests positive for COVID-19, all relevant classes will be notified via an email by the Corona Corps Care Team with instructions for students and staff based on their vaccination status. Specifically:
  1. **Vaccinated and Asymptomatic students**: Quarantine not required, but daily self-monitoring before coming on campus is advised; sign up for testing through MAP 3-5 days after exposure if advised you are a contact.”
  2. **Unvaccinated or partially vaccinated students**: 14-day quarantine advised – do not come to class – and sign up for testing 3-5 days after notification through MAP, if asymptomatic, or through University Health Services (541-346-2770) or your primary care provider, if symptomatic.
  3. **Symptomatic students**: stay home (do not come to class/campus), complete the online [case and contact form](#), and contact University Health Services (541-346-2770) or your primary care provider to arrange for immediate COVID-19 testing.

Students identified as a **close contacts** of a positive case will be contacted by the Corona Corps Care Team (541-346-2292).

- **Support**: The following resources are available to you as a student.

  1. [University Health Services](#) or call (541) 346-2770
  2. [University Counseling Center](#) or call (541) 346-3277 or (541) 346-3227 (after hrs.)
  3. [MAP Covid-19 Testing](#)
  4. [Corona Corps](#) or call (541) 346-2292
  5. [Academic Advising](#) or call (541) 346-3211
  6. [Dean of Students](#) or call (541)-346-3216

**Good Classroom Citizenship**

- Wear your mask and make sure it fits you well
- Stay home if you’re sick
- Get to know your neighbors in class, and let them know if you test positive
- Get tested regularly
- Watch for signs and symptoms with the daily symptom self-check
- Wash your hands frequently or use hand sanitizer

Complete the UO COVID-19 [case and contact reporting form](#) if you test positive or are a close contact of someone who tests positive.”
Accessible Education - (see https://aec.uoregon.edu/best-practices-faculty for more information)
Please let me know within the first two weeks of the term if you need assistance to fully participate in the course. Participation includes access to lectures, web-based information, in-class activities, and exams. The Accessible Education Center (http://aec.uoregon.edu/) works with students to provide an instructor notification letter that outlines accommodations and adjustments to class design that will enable better access. Contact the Accessible Education Center for assistance with access or disability-related questions or concerns."

Academic Misconduct - You can find faculty resources on academic misconduct here: https://dos.uoregon.edu/faculty-resources: The University Student Conduct Code (available at conduct.uoregon.edu) defines academic misconduct. Students are prohibited from committing or attempting to commit any act that constitutes academic misconduct. By way of example, students should not give or receive (or attempt to give or receive) unauthorized help on assignments or examinations without express permission from the instructor. Students should properly acknowledge and document all sources of information (e.g. quotations, paraphrases, ideas) and use only the sources and resources authorized by the instructor. If there is any question about whether an act constitutes academic misconduct, it is the students’ obligation to clarify the question with the instructor before committing or attempting to commit the act. Additional information about a common form of academic misconduct, plagiarism, is available at https://researchguides.uoregon.edu/citing-plagiarism.

Inclement Weather It is generally expected that class will meet unless the University is officially closed for inclement weather. If it becomes necessary to cancel class while the University remains open, this will be announced on Canvas and by email. Updates on inclement weather and closure are also communicated in other ways described here: https://hr.uoregon.edu/about-hr/campus-notifications/inclement-weather/inclement-weather-immediate-updates

Reporting Obligations
Your instructors are designated reporter and assisting employee). For information about our reporting obligations as an employee, please see Employee Reporting Obligations on the Office of Investigations and Civil Rights Compliance (OICRC) website. Students experiencing sex or gender-based discrimination, harassment or violence should call the 24-7 hotline 541-346-SAFE [7244] or visit safe.uoregon.edu for help. Students experiencing all forms of prohibited discrimination or harassment may contact the Dean of Students Office at 5411-346-3216 or the non-confidential Title IX Coordinator/OICRC at 541-346-3123. Additional resources are available at investigations.uoregon.edu/how-get-support. I am also a mandatory reporter of child abuse. Please find more information at Mandatory Reporting of Child Abuse and Neglect.

Mental Health and Wellness Life at college can be very complicated. Students often feel overwhelmed or stressed, experience anxiety or depression, struggle with relationships, or just need help navigating challenges in their life. If you're facing such challenges, you don't need to handle them on your own—there's help and support on campus.
As your instructor if I believe you may need additional support, I will express my concerns, the reasons for them, and refer you to resources that might be helpful. It is not my intention to know the details of what might be bothering you, but simply to let you know I care and that help is available. Getting help is a courageous thing to do—for yourself and those you care about.
University Health Services help students cope with difficult emotions and life stressors. If you need general resources on coping with stress or want to talk with another student who has been in the same place as you, visit the Duck Nest (located in the EMU on the ground floor) and get help from one of the specially trained Peer Wellness Advocates. Find out more at health.uoregon.edu/ducknest.
University Counseling Services (UCS) has a team of dedicated staff members to support you with your concerns, many of whom can provide identity-based support. All clinical services are free and confidential. Find out more at counseling.uoregon.edu or by calling 541-346-3227 (anytime UCS is closed, the After-Hours Support and Crisis Line is available by calling this same number).

Basic Needs
Any student who has difficulty affording groceries or accessing sufficient food to eat every day, or who lacks a safe and stable place to live and believes this may affect their performance in the course is urged to contact the Dean of Students Office (346-3216, 164 Oregon Hall) for support.
This UO webpage includes resources for food, housing, healthcare, childcare, transportation, technology, finances, and legal support: https://blogs.uoregon.edu/basicneeds/food/

**Accommodation for Religious Observances**

The university makes reasonable accommodations, upon request, for students who are unable to attend a class for religious obligations or observance reasons, in accordance with the university discrimination policy which says “Any student who, because of religious beliefs, is unable to attend classes on a particular day shall be excused from attendance requirements and from any examination or other assignment on that day. The student shall make up the examination or other assignment missed because of the absence.” To request accommodations for this course for religious observance, visit the Office of the Registrar’s website (https://registrar.uoregon.edu/calendars/religious-observances) and complete and submit to the instructor the “Student Religious Accommodation Request” form prior to the end of the second week of the term.