Applied Statistics for the Biological Sciences
Statistics 100 – Cork 2019

Instructor:	Professor Christiana Drake
Office Hrs:	after lecture 60 minutes each day
Office:	TBD
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Website:	Course materials will be posted on Canvas

Lecture:	June 25, 26, 27: 6.5 hours of lecture and 2 hours of discussion July 1, 2, 3: 6.5 hours of lectures and 2 hours of discussion July 8, 9, 10, 11: 8.5 hours of lecture and 3 hours of discussion July 15, 16, 17, 18: 8.5 hours of lecture and 3 hours discussion July 19: summer course ends
Location:	TBD
Prerequisite:	MAT 16B or equivalent desired but not required
GE Credit:	SciEng

Required Text:

The Analysis of Biological Data 1st or 2nd Ed --- Whitlock and Schluter, copies of the textbook will be provided by the instructor for students to share. No need to bring your own.

Supplemental Texts:

There are several other texts used in STA 100, instructor will bring copies, space permitting in luggage.

Computing:

You might want to bring a graphing calculator or download an emulator to your laptop. The TI-83/84 or equivalent is easiest to use. We will also analyze data sets that require use of statistical packages. We recommend open source software R. Instructions on how to download will be provided. You may also choose other software such as SAS, Minitab or SPSS but no support will be provided. Your exams are take home, therefore, you will be able to use your computers to do calculations

Grading:

There will be two take home exams: July 8 and July 19; each counts 40%.
There will be a term project (10%) consisting of a data analysis, it needs to be submitted as a written report of about 5 pages due July 19. An interim report is due July 10. The report should be about 2 pages in length and contain descriptives statistics of the variables in the data set and a plan for data analysis. No extensions will be given. The interim report will be 20% of your term project grade. In class participation will be 10%.

Course content:

Statistics 100 will cover basic descriptive statistics, probability, estimation of means and proportions, comparison of means and proportions, contingency table analysis, goodness of fit tests, analysis of variance and regression.

Objectives:

The goal of the course is the introduction of statistical techniques typically encountered in biological data. Examples will be drawn from biology, human and veterinary medicine. At the end of the course you will be able to:

- Examine and summarize data
- Understand and interpret statistical techniques commonly used in biological applications
- Analyze data from start to finish
- Apply statistical methods to real world problems
- Understand the power and limitations of statistical methods

Course Outline:

Part 1:descriptives, probability and hypothesis testing

- histogram, measures of center and dispersion (chap 2,3)
- uncertainty (chap 4), probability
- probability, conditional probability (chap 5)
- hypothesis testing (chap 6)

Part 2: chi-squared tests, the normal distribution, inferences about means

- proportions (chap 7)
- goodness-of-fit tests (chap 8)
- chi-square tests for association (chap 9)
- the normal distribution (chap 10)
- inferences about a mean (chap 11)
- comparison of 2 means (chap 12)

Part 3: analysis of variance, correlation and regression

- analysis of variance (chapter 15)
- correlation (chap 16)
- regression (chap 17)

About your instructor and teaching assistants:

Chris Drake is a professor in the Department of Statistics. She has been teaching at UC Davis for 26 years. She teaches statistics courses at the lower division, upper division and graduate level. Her research interests are causal inference (using statistical techniques to identify causes of diseases in medical studies), missing data (sometimes data file do not have information on all variables for all study participants) and collaboration with medical and veterinary researchers.