UNIVERSITY OF CALGARY

FACULTY OF SCIENCE
Department of Mathematics and Statistics

Statistics 327   Environmental Statistics

(see Course Descriptions for the applicable academic year: http://www.ucalgary.ca/pubs/calendar/)

Syllabus

Topics	Number of Hours
Data collection, summarizing data, frequency distributions, relative frequency and probability, cumulative frequency and probability, means (averages), variances, standard deviations, (mean and standard deviation for grouped data)	3
Graphical displays of data (dot plot, stem and leaf diagram, ie Chart, bar graph, histogram) ranking data, quartiles, IQR, percentiles, box and whisker plot, introduction to probability	3
Probability, addition rule, Conditional probability, independence, Bayes' Rule, factorials, permutations and combinations	3
Bayes' Rule, Binomial and Poisson Distributions	3
Empirical Rule (normal curve), standardizing, normal approximation to Binomial, Central limit theorem	2
Determining required sample size for a population proportion, Confidence interval for a population mean (large and small samples), t-distribution, determining required sample size for a population mean	3
Scientific method, p-values, Type I and Type II error, selecting analyses and t-test, z-test for one population proportion z-test, t-test for one population mean, paired data F-test, Two independent samples pooled and non-pooled t-test	5
ANOVA, one-way multiple pooled t-tests, two-way ANOVA, ANOVA two-way replication. Tukey post hoc test for one-way ANOVA	4
Non-parametric tests for median, one-sample Wilcoxon, Paired Wilcoxon, Mann-Whitney, Kruskal Wallis, Freidman	2
Chi-square goodness-of-fit test, and independence test	2
Yates correction, Fisher exact test, standardizing proportions, Confidence interval for difference in two population proportions	2
Correlation and Regression	2
TOTAL	**34**

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STAT 327 Course Outcomes

Ying Yan and Scott Robison

By the end of this course, a successful STAT 327 student will be able to:

1. explain data collection procedures, use descriptive statistics to summarize data, and construct and interpret graphical representations of data.

2. describe basic probability rules and probability models, define random variables in probability models, and calculate mean, variance, standard deviation, covariance, and correlation.

3. define and contrast several discrete and continuous distributions, such as Bernoulli, binomial, Poisson, uniform, exponential, normal, t, and chi-squared distributions.

4. define study population, population parameters, random samples, statistics, sampling distributions, and identify them in simple real world problems.

5. construct and contrast basic statistical hypothesis testing methods, such as z tests and t tests for population mean, population proportion, and population difference.

6. calculate and interpret level of significance, critical value, p-value, decision rules, type I error, type II error, power, and confidence intervals.

7. apply and interpret ANOVA models and linear regression models in simple real world problems.

8. construct some nonparametric tests, such as Mann-Whitney test.

9. use a standard statistical software, such as R or Minitab, to implement the statistical methods in this course.