



Statistics 431 Introduction to Biostatistics

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

Course Objectives:

After completing this course successfully, the students will be able to:

- Understand the role of biostatistics in public health or medical studies;
- Use descriptive tools to summarize and display data from public health or medical studies;
- Understand the principles of various study designs, and explain their advantages and limitations;
- Identify appropriate tests to perform hypothesis testing, and interpret the outputs adequately;
- Differentiate between quantitative problems from public health or medical studies that can be addressed by statistical tools, choose the appropriate statistical procedures, and interpret the statistical results in a public health or medicine context;
- Get familiar with statistical software and standard packages for biostatistics.

Syllabus:

Topics	Number of hours
Describing and Displaying Data	2
Review of Probability and Statistics	2
ANOVA	4
Study Designs and Contingency Tables	7
Measures of association	5
Tests of significance	5
Categorical Data Analysis and Regression	7
Time to Event Data Analysis	4
Total hours	36

STAT 431 (Introduction to Biostatistics) Course Outcomes

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By the end of this course, students should be able to:

1. use basic statistical methods, such as descriptive statistics, graphical plots, hypothesis testing, ANOVA models, and linear regression models, to analyze real world problems arising in medical science, public health, and biology.
2. distinguish, calculate, and interpret measures of occurrence of diseases, including prevalence, incidence, risk, and odds of disease.
3. distinguish, calculate, and interpret measures of association, including odds ratio, relative risk, and risk difference.
4. distinguish and interpret several study designs, including cross-sectional study design, cohort study design, and case-control study design.
5. construct contingency tables for study designs and analyze data from contingency tables.
6. use nonparametric methods and regression methods to analyze categorical data and time-to-event data in biostatistics.
7. use a standard statistical software, such as R or SAS, to implement the statistical methods in this course.
8. prepare reports to conclude findings in data analysis and communicate with collaborative researchers.