a place of mind
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Graduate Pathways to Success/Statistics 2021-22 Webinar Series

Statistics is a scientific discipline that enables reaching meaningful conclusions from data. To produce reliable results, you need to justify the choice of the applied statistical methods and models as well as validate the underlying assumptions.

This webinar series provides an overview of foundational statistical concepts using examples of various data structures. We will discuss types of study designs, methods, models and appropriate application of statistical tests along with interpretations of the results obtained from different statistical tools. The aim is to equip the attendees with a deeper understanding of the key concepts of statistical methodology, rather than solving specific project problems or providing hands-on guidance.

Each webinar is a self-contained introduction to different statistical concepts, but as topics become increasingly complex with each consecutive webinar, some aspects will be built on concepts taught in the previous sessions. Hence, there is benefit in attending all the webinars.

If you are a graduate student and have questions about your specific project, please see (https://asda.stat.ubc.ca/sos/) to book a one-hour free statistical consultation.

1) **Exploratory Data Analysis**
   Wednesday, September 29th, 1:00 – 3:00 PM
   This is the first workshop in a 6-part series focused on the foundations of statistics.

Exploratory Data Analysis (EDA) is essential for understanding your data and a necessary step prior to any testing or modeling. You will learn insightful graphical and numerical techniques for investigating important aspects of your data such as relationships between variables and unusual observations. More specifically you will learn about:

- exploring categorical data using contingency tables and side-by-side bar charts
- exploring numerical data using histograms, box plots, density plots, scatterplots and 3 variable plots
- various useful measures of center, spread and shape for describing data and how to choose between them
- identifying and handling outliers

Check out the video below for a teaser from a previous session:
https://www.youtube.com/watch?v=5l3kf50bTyg

2) Study Design and Data Collection Essentials
Thursday, October 28th, 1:00 – 3:00 PM
This is the 2nd workshop in a 6-part series focused on the foundations of statistics.

This webinar focuses on the first two crucial steps in a statistical investigation: 1) identify a question and 2) collect the right data to answer this question. You will learn about:

- observational studies and experiments
- scope of inference
- various sampling strategies and their benefits/drawbacks
- key parts of experimental design (randomization, replication, blocking)
- power and sample size calculations

Check out the video below for a teaser from a previous session:
https://www.youtube.com/watch?v=oW0IL5lLNSI

3) Two group comparisons and ANOVA
Thursday, November 25th, 1:00 – 3:00 PM
This is the 3rd workshop in a 6-part series focused on the foundations of statistics.

In this webinar, you will learn how to gain insight from a random and unbiased data sample of a population:

- population distribution vs sample mean distribution
- hypothesis testing
- statistical significance
- t-test for comparing two groups and its assumptions
- non-parametric alternatives to t-test and when to use them
- one-way and two-way ANOVA for comparing more than two groups

Check out the video below for a teaser from a previous session:
https://www.youtube.com/watch?v=c7WPPk03_jg

4) Correlation and Linear Regression
Thursday, January 27th, 1:00 – 3:00 PM
This is the 4th workshop in a 6-part series focused on the foundations of statistics.

Understanding relationships is a key part of the scientific inquiry process. You will learn how to describe relationships between two numerical quantities through correlation measures and simple linear regression models. This will also be extended to multiple linear regression for including additional predictor variables. Specific topics include:

- correlation vs causation
- interpretation of regression model coefficients
- assessing the “fit” of a model
- model selection

Check out the video below for a teaser from a previous session:
https://www.youtube.com/watch?v=KVzGCfjbRCQ

5) **Logistic and Poisson Regression**
   Thursday, February 17th, 1:00 – 3:00 PM
   This is the 5th workshop in a 6-part series focused on the foundations of statistics.

Learn about generalized linear models (GLM) for categorical and count outcomes. Necessary for understanding and using these models, the following will be covered:

- interpretation of odds, odds ratios and rate ratios
- variable "exposure" times
- overdispersion
- negative binomial regression
- considerations for Likert scale outcomes
- handling excess zeros

Check out the video below for a teaser from a previous session:
https://www.youtube.com/watch?v=SgaqAWX7u18

6) **Mixed Effects Models**
   Thursday, March 17th, 1:00 – 3:00 PM
   This is the last workshop in a 6-part series focused on the foundations of statistics.

This webinar is critical for understanding when linear regression models aren't applicable and how to model dependent data. Topics that will be covered are:

- consequences of ignoring dependence (increased risk of false conclusions)
- repeated measures and other examples of dependent data
- variance components
- interpretation in the linear and generalized linear mixed effects context

Check out the video below for a teaser from a previous session:
https://www.youtube.com/watch?v=VeOGCaJTct8

All sessions are posted at https://www.grad.ubc.ca/current-students/professional-development/workshops-events. Registration for each session opens on the Monday, the week prior to each event.