COURSE CURRICULUM

This course is composed of video lectures explaining how to perform the analysis on the statistical software (SPSS and JMP). The course also has ample exercises and quizzes testing your understanding of statistics and your ability to perform statistical analysis. You will have access to multiple datasets which you can use to perform the analysis shown in the videos and exercises.

Lesson 1: Introduction to statistical analysis

The first lesson will serve as an introduction to performing statistical analysis. You will also learn how to prepare your data before starting the descriptive and comparative analysis. The following will be discussed in detail:

- How to clean your data
- How to import your data into the statistical software
- Types of variables
- How to organize and code your data
- Formulas
- Combining datasheets

Videos: 2h/40min JMP // 1h/12min SPSS
Exercises: 9 JMP / 9 SPSS

Lesson 2: Descriptive analysis

This lesson will discuss how to describe and visualize your data. The following points will be discussed:

- Descriptive analysis of categorical data
- Descriptive analysis of numerical data

- How to assess normality of data distribution
- When to choose median vs. mean
- 95% confidence interval
- How to perform sub-analysis
- Descriptive analysis from published studies How to present your data in a research article
- How to visualize your data using bar graphs, histograms, and box plots

Videos: 1h/52min JMP // 1h/45min SPSS
Exercises: 6 JMP / 6 SPSS

Lesson 3: Hypothesis testing for categorical variables

This lesson will show you how to analyze your categorical variables using both parametric and non-parametric tests. The following topics will be covered:

- Introduction to hypothesis testing
- Chi-squared test
- Fisher's exact test
- 2×2 table and RxC table
- Relative risk and odds ratio
- Statistical errors
- How to present your data in a research article
- Hypothesis testing for categorical variables from published studies

Videos: 1h/12min JMP // 1h/4min SPSS
Exercises: 7 JMP / 7 SPSS

Lesson 4: Hypothesis testing for numerical variables

This lesson will show you how to analyze your numerical variables using both parametric and non-parametric tests. The following topics will be covered:

- Comparing means of two groups
- T-test and Mann–Whitney U test
- Comparing means of >2 groups
- One-way ANOVA and Kruskal–Wallis test
- Multiple comparisons tests
- Comparing means of two paired groups
- Paired t-test and Wilcoxon signed-rank test
- How to present your data in a research article
- Hypothesis testing for numerical variables from published studies

Videos: 1h/34min JMP // 1h/34min SPSS

Lesson 5: Power analysis and sample size calculation

This lesson will discuss how to calculate the sample size required to achieve statistical significance before you start your research study. The following points will be discussed:

- Introduction to power analysis
- The relationship between sample size, power, standard deviation, and effect size
- How to perform power analysis for two means
- How to perform power analysis for >2 means
- How to perform power analysis for two proportions

Videos: 23min JMP // 26min SPSS

Lesson 6: Simple linear regression

This lesson will discuss how to analyze a numeric predictor and a numeric outcome using simple linear regression and correlation analysis. This lesson will cover the following topics in detail:

- Assumptions of linear regression
- Scatter plots for linear regression
- Methods of linear regression
- Assessing the regression fit
- Adjusted R square
- Standardized and unstandardized beta coefficients
- Correlation analysis: Spearman and Pearson
- Correlation coefficient
- How to present your data in a research article

Videos: 43min JMP // 1h/13min SPSS

Lesson 7: Multiple Linear regression

This lesson will go over analyzing multiple numeric and categorical predictors and a numeric outcome using multiple linear regression. The following points will be discussed:

- Assumptions of multiple linear regression
- Backward, forward, and stepwise model selection
- Assessing the regression fit
- Adjusted R square
- Standardized and unstandardized beta coefficients
- How to present your data in a research article

Videos: 53min JMP // 1h/4min SPSS

Lesson 8: Logistic regression

This lesson will teach you how to analyze multiple numeric and categorical predictors and a categorical outcome using multiple linear regression. We will discuss the following:

- Assumptions of logistic regression
- Methods of logistic regression
- Considerations for numeric predictors
- Odds ratios and 95% CI
- Hosmer-Lemeshow goodness of fit
- How to present your data in a research article

Videos: 1h/2min JMP // 1h/21min SPSS

Lesson 9: Survival analysis

This lesson will go over time-to-event analysis including a discussion of the following:

- Introduction to survival analysis
- Kaplan-Meier curves
- The log-rank test and Wilcoxon test
- Hazard ratio
- Cox proportional–hazards model
- How to present your data in a research article
- Survival analysis from published studies

Videos: 1h/10min JMP // 1h/17min SPSS