



Research School for Transport,  
Infrastructure and Logistics

## Course Data-analysis and Statistics

<b>Date:</b>	<b>4, 11 &amp; 18 October 2022</b>
<b>Time:</b>	<b>10.00 – 16.00 h.</b>
<b>Location:</b>	<b>TU Delft</b>
<b>Course leader:</b>	<b>Dr. Maarten Kroesen and Dr. Eric Molin</b>
<b>Days:</b>	<b>3</b>
<b>ECTS:</b>	<b>1 (class only) - 3 (class + passing assignment)</b>
<b>Course fee:</b>	<b>Free for TRAIL/Beta/OML members, others please contact the TRAIL office</b>
<b>Registration:</b>	<b><a href="http://www.rstrail.nl">www.rstrail.nl</a></b>

### Objectives

After this course attendees are able to:

1. Explain the basic principles behind statistical modelling (Central Limit Theorem).
2. Choose appropriate bivariate data-analysis techniques\* (given a particular research question), correctly apply these techniques (by formulating statistical hypotheses, checking the statistical assumptions and deriving the test statistic) and interpret their results in meaningful ways.
3. Estimate a multivariate regression model, check its assumptions (normality, linearity, homoscedasticity) and interpret its outcomes.

\* The following data-analysis techniques will be treated: descriptive data analysis (mean, median, variance, standard deviation), univariate (one sample t-test, proportion test) and bivariate parametric tests (paired/independent samples t-test, ANOVA, Pearson correlation) and a non-parametric test (chi-square).

### Course description

In this course attendees will actively work on solving concrete statistical problems in the domains of transport, infrastructure and logistics using various bivariate and multivariate data-analysis techniques. The course will extensively treat the basic principles behind statistical modelling so that attendees really understand what the results of statistical tests mean.

### Assignment

Attendees have to apply several data-analysis techniques to their own data (or a given dataset) and report the results in a brief research report.

### Program

- Day 1 – Probability density functions, basic principles behind statistical modelling, descriptive statistics and bivariate data-analysis techniques (Maarten Kroesen)  
Day 2 – Continuation of bivariate data-analysis techniques (Maarten Kroesen)  
Day 3 – Multiple regression (Eric Molin)

### Course material

Slides and online materials

### Methodology

The working method consists of oral lectures combined with (short) in-class assignments using SPSS. To this end, students should bring a laptop with SPSS installed on it.

### Prerequisite

None