B027109 - STATISTICAL DATA ANALYSIS

Course Content (*Diploma Supplement*)

In the past decade significant attention has been given to the development of tools that attempt to measure the vulnerability, risk or resilience of communities to disasters. Within this context, this course will teach participants different ways to measure social vulnerability, outlining limitations of different approaches. Particular attention will be given to the development of composite indices and to statistical methods to quantify these concepts.

Learning Objectives and Contents

The course deals with statistical methods for the analysis of quantitative and qualitative data which are typically encountered in social science.
In the first part, emphasis will be given to the theory and the application of linear and generalized linear models for the analysis of the effect one or more independent variables on a given response of interest. In particular, general linear models will be introduced for the analysis of quantitative, continuous, responses. These will be extended in a generalized linear model perspective, with the aim of accounting for general responses, such as binary variables and counts. At the end of the course, students will be able to define, estimate, and properly interpret the results, also on the basis of real-case studies.
Contents: Linear model. Model definition. Model assumptions. Ordinary Least Square estimation. Inference on model parameters. Model checking. Generalized linear models. Exponential family distributions. Model definition. Model assumptions. Parameter estimation. Inference on model parameters. Binary and count data.

In the second part, attention will be given to the development of composite indices to quantify the concepts of social vulnerability.
Contents: Steps for constructing a composite indicator. Developing a theoretical framework. Selecting variables. Reducing the complexity. The approaches to reduction. Synthesis of indicators: different perspectives. Synthesis of indicators: technical issues (aggregative-compensative approaches and non-compensative approaches). Representing the complexity (dashboards).Explaining the complexity: modelling indicators.

Prerequisites

Familiarity with linear algebra and basic knowledge of statistical inference are required.