

## Courses 2014-15

November 24-28, 2014, 09:30 -11.30 h

BCAM Mazarredo 14 , 48009 Bilbao, Basque Country, Spain [www.bcamath.org](http://www.bcamath.org)

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### INTRODUCTION TO GENERALIZED LINEAR MODELS WITH R

Prerequisites: You must bring your own laptop with R software installed, basic knowledge of R and linear models.

#### Aims:

This course is oriented to postgraduate students, researchers and data analysts who need to move beyond standard linear models for modeling data that are not normally distributed. This short course provides an overview of generalized linear models (GLM's) using the R software. GLM's are most commonly used to model binary or count data. These types of data are very common in many research areas such as Biology, Medicine, Engineering, Business, Economics, and many other fields. In this course we will focus on real applications and examples with an emphasis on model validation, estimation and interpretation of the parameters and variable selection and goodness-of-fit.

#### Content:

1. Introduction to Generalized Linear Models (GLM's)
  - 1.1 Short review of linear regression.
  - 1.2 What is a GLM and why to use them?
  - 1.3 Components of a GLM
2. Models for binary data
  - 2.1 Logistic regression
  - 2.2 Estimation and interpretation of the parameters
  - 2.4 Some examples
3. Multinomial regression
  - 3.1 Function multinom() in R
  - 3.2 Interpretation of the parameters
  - 3.3 Variable selection
  - 3.4 Some examples
4. Ordinal regression
  - 4.1 Proportional odds model
  - 4.2 Function polr() in R
  - 4.3 Some examples
5. Poisson regression
  - 5.1 Poisson distribution
  - 5.2 Poisson regression for incidence rates
  - 5.3 Some examples

**IMPORTANT NOTICE:** The course will be limited to 25 students due to space limitations. Registration is first-come, first-served. You'll be notified by e-mail, so please fill up the registration form quickly.

Registration (before 20th of November): Fill the form at <http://goo.gl/forms/qmRWgVygF7>