



ISPUP

INSTITUTO DE SAÚDE PÚBLICA
DA UNIVERSIDADE DO PORTO

INTENSIVE COURSE

GAMLSS – A distributional regression approach – 1st Edition

Face to face sessions
3rd June - 5th June 2024

Intensive Course

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The Generalized Additive Models for Location, Scale and Shape (GAMLSS) introduced almost 20 year ago by Rigby and Stasinopoulos (2005), are a very general framework for univariate regression. Their novelty arise from the fact that all the parameters of the assumed parametric distribution of the response (target) can be modelled as functions of the explanatory variables (features). This allows modelling a response variable with high skewness or kurtosis. The assumed distribution can be any theoretical distribution as described by Rigby et al. (2019). There are different ways for modelling all the distribution parameters using explanatory variables. These include linear terms, smoothing terms and any sensible machine learning technique like neural networks, LASSO, principal component regression etc., see Stasinopoulos et al. (2017). There are also different ways of fitting the model which includes the classical (using penalized likelihood), the Bayesian using MCMC, or boosting, see Stasinopoulos et al. (2024).

GAMLSS

Audience: This short course is designed for practitioners and applied statisticians which would like to know how to go about modelling their data set using GAMLSS. The short course will discuss exploratory checking of the data, selection of the right distribution, and selection of the right explanatory variables modelling each parameter of the distribution of the

response. Interpretation and the use of the GAMLSS model in prediction will be discussed. A special section will be devoted to the creation of reference interval curves (centile estimation).

The course is targeted at researchers as well as master's and PhD students in statistics, mathematics, medicine, public health, and related areas.

Course responsible:

Denisa Mendonça

Associate Professor at the Institute of Biomedical Sciences Abel Salazar and member of the EPIUnit and of ITR at the Institute of Public Health, University of Porto.

Milton Severo

Invited Associate Professor at the Institute of Biomedical Sciences Abel Salazar and member of the EPIUnit and of ITR at the Institute of Public Health, University of Porto.

Staff:

Mikis Stasinopoulos

Professor in statistics at the University of Greenwich, UK. Creator and author of three books on GAMLSS.

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Requirements: For the practical sections participants laptops with R and possible R-studio is encouraged.

Software: R and R-studio

Course material: Course materials will be available in English.

Language: English

Certificate:

A certificate of participation will be given to the participants who attend at least 75% of the course.

ECTS: Not applicable

Venue:

The course will take place in the Computer Room (3rd floor) at the Instituto de Saúde Pública da Universidade do Porto.

Duration and Schedule:

03 – 05 June: 09.30 am to 12.30 pm; 01.30 pm to 04.30 pm.

Selection of participants: Maximum of 20 participants, selected by order of registration.

Minimum number of participants: 10

Fee:

300 euros

Discounts: 20% for students from a specialization course in Public Health, master's students in Public Health, PhD students in Public Health, Global Public Health, or Applied Mathematics, and members of SPE or APE.

Application deadline and payment:

May 19, 2024

Registration:

Online registration at

<http://www.ispup.up.pt>

Cancellation and return of payment:

The cancellation up to 2 working days before the start of the course implies the return of 50% of the registration fee. After this date, no refund will be made.

Contacts:

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Program

Day 1 03 JUNE 2024	09.30 am to 12.30 pm	- Why GAMLSS; - Available software; - Practical.
	01.30 pm to 04.30 pm	- Distributions; - Continuous distributions; - Practical.

Day 2 04 JUNE 2024	09.30 am to 12.30 pm	- Discrete distributions; - Mixed distributions; - Practical.
	01.30 pm to 04.30 pm	- Model Fitting; - Model Selection; - Practical.

Day 3 05 JUNE 2024	09.30 am to 12.30 pm	- Centiles estimation; - Model Diagnostics; - Practical.
	01.30 pm to 04.30 pm	- Model Comparison; - Model interpretation; - Practical.