

Title: Workshop on Statistical Modeling  
Subtitle: Statistical models for analyzing data  
Duration: 3hrs  
Speakers: Prof. Liberato Camilleri  
Date: 13th of June 2017  
Audience: Masters and PhD students and researchers who are interested in using statistical models for analyzing data.

## *Workshop on Statistical Modeling*

Statistical models are essential to assess the relationship between a response variable and a number of explanatory variables (predictors). Traditionally, regression models were used to assess the impact of each predictor on the model fit; however these models assumed a normally distributed response variable. To overcome this limitation, generalized linear models were developed, which accommodate any distribution which is a member of the exponential family. These include the Gamma Binomial, Multinomial, Poisson, Negative Binomial and Inverse Gaussian distributions. The Inverse Gaussian and Gamma distributions are used for right skewed response variables. The Binomial and Multinomial distributions are used for dichotomous and polychotomous categorical variables, while the Poisson and Negative Binomial distribution are used for responses comprising counts (frequencies)

This workshop will discuss briefly the theoretical framework of generalized linear models and the estimation procedure using maximum likelihood estimation. A number of models, within the GLM framework will be fitted to various dataset, including the widely used Logistic regression and Log-linear models.

One of the limitations of generalized linear models is the assumption that the responses are independent; however this assumption is often violated in the presence of highly correlated nested data or repeated measures. The workshop will also discuss other model forms, including Generalized Estimation Equations for repeated measures and multilevel models for hierarchical nested data.

Professor Liberato Camilleri is the head of the Statistics and Operations Research Department at the University of Malta and is also an associate editor of the journal *Xjenza*. He is a PhD graduate in Applied Statistics (Lancaster University) and has contributed several publications using Survival models, Multilevel models, Structural Equations models, Latent Class models, Item Response models and Generalized Linear Regression models. These models were applied to various applications related to education, psychology, medicine, pharmacy, engineering, finance and science.